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Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221

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NMED
Hazardous Waste Bureau

Mr. John E. Kieling, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Subject: Review of Savannah River Site - Central Characterization Program Waste Stream Profile Form Number SR-RH-221H.01, *HBL Heterogeneous RH Debris*

Dear Mr. Kieling:

The Department of Energy, Carlsbad Field Office has approved the Waste Stream Profile Form (WSPF) Number SR-RH-221H.01, *HBL Heterogeneous RH Debris* for the Central Characterization Program at the Savannah River Site.

Enclosed is a copy of the WSPF as required by Section C-5a of the Waste Isolation Pilot Plant, Hazardous Waste Facility Permit, No. NM4890139088-TSDF.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have questions, please contact Mr. J. R. Stroble, Director of the Office of the National TRU Program, at (575) 234-7313.

Sincerely,

DC Bryson for
Jose R. Franco, Manager
Carlsbad Field Office

Enclosure

cc: w/enclosure

S. Holmes, NMED	*ED
T. Kliphuis, NMED	ED
R. Maestes, NMED	ED
C. Smith, NMED	ED
RCRA Chronology Record	ED
WIPP Operating Record	ED
CBFO M&RC	

*ED denotes electronic distribution

CBFO:NTP:JRS:PG:14-1818:UFC 5900.00

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Attachment 2 – CCP Waste Stream Profile Form

<table>
<tr><td colspan="4">**(1) Waste Stream Profile Number:** SR-RH-221H.01</td></tr>
<tr><td colspan="2">(2) Generator site name: Savannah River Site</td><td colspan="2">(3) Generator site EPA ID: SC1890008989</td></tr>
<tr><td colspan="2">(4) Technical contact: Irene Joo</td><td colspan="2">(5) Technical contact phone number: 303-843-2165</td></tr>
<tr><td colspan="4">(6) Date of audit report approval by New Mexico Environment Department (NMED): September 16, 2013</td></tr>
<tr><td colspan="4">(7) Title, version number, and date of documents used for WIPP-WAP Certification:
CCP-PO-001 *CCP Transuranic Waste Characterization Quality Assurance Project Plan*, Revision 21, May 31, 2013
CCP-PO-002 *CCP Transuranic Waste Certification Plan,* Revision 27, May 31, 2013
CCP-PO-004, *CCP/SRS Interface Document,* Revision 34, August 29, 2013
CCP-AK-SRS-600, *Central Characterization Program Acceptable Knowledge Summary Report for Savannah River Site Remote-Handled Transuranic Waste: Waste Streams SR-RH-221H.01, SR-RH-221H.02*, Revision 1, November 27, 2012</td></tr>
<tr><td colspan="4">(8) Did your facility generate this waste? YES [X] NO [ ]</td></tr>
<tr><td colspan="4">(9) If no, provide the name and EPA ID of the original generator: NA</td></tr>
<tr><td colspan="4">**Waste Stream Information**</td></tr>
<tr><td colspan="2">(10) WIPP ID: SR-RH-221H.01</td><td colspan="2">(11) Summary Category Group: S5000</td></tr>
<tr><td colspan="2">(12) Waste Matrix Code Group: Heterogeneous Debris Waste</td><td colspan="2">(13) Waste Stream Name: HBL Heterogeneous RH Debris</td></tr>
<tr><td colspan="4">(14) Description from the ATWIR: This waste stream is defense related, remote handled TRU waste and is composed of dry heterogeneous organic and inorganic debris.</td></tr>
<tr><td colspan="4">(15) Defense TRU Waste: YES [X] NO [ ]</td></tr>
<tr><td colspan="4">(16) Check One: CH [ ] RH [X]</td></tr>
<tr><td>(17) Number of SWBs NA
(17a) Number of SLB2 NA</td><td colspan="2">(18) Number of Drums NA</td><td>(19) Number of Canisters 6[1]</td></tr>
<tr><td colspan="4">(20) Batch Data Report numbers supporting this waste stream characterization: See Characterization Information Summary (CIS) Correlation of Container Identification Numbers to Batch Data Report Numbers</td></tr>
<tr><td colspan="4">(21) List applicable EPA Hazardous Waste Numbers: D006, D008, D009, D019, D022, D029, D039, D040, D043, F001, F002, F005, U133</td></tr>
<tr><td colspan="4">(22) Applicable TRUCON Content Numbers: SR321, SR322, SR325</td></tr>
<tr><td colspan="4">(23)**Acceptable Knowledge Information**</td></tr>
<tr><td colspan="4">**(For the following, enter the supporting documentation used [i.e., references and dates])**</td></tr>
<tr><td colspan="4">**Required Program Information**</td></tr>
<tr><td colspan="4">(23A) Map of site: CCP-AK-SRS-600, Revision 1, November 27, 2012, Figures 1, 2 and 3</td></tr>
<tr><td colspan="4">(23B) Facility mission description: CCP-AK-SRS-600 Revision 1, November 27, 2012, Section 4.3</td></tr>
<tr><td colspan="4">(23C) Description of operations that generate waste: CCP-AK-SRS-600 Revision 1, November 27, 2012, Section 4.7</td></tr>
<tr><td colspan="4">(23D) Waste identification/categorization schemes: CCP-AK-SRS-600 Revision 1, November 27, 2012, Section 4.6.3</td></tr>
<tr><td colspan="4">(23E) Types and quantities of waste generated: CCP-AK-SRS-600 Revision 1, November 27, 2012, Section 4.6.1</td></tr>
<tr><td colspan="4">(23F) Correlation of waste streams generated from the same building and process, as applicable: CCP-AK-SRS-600 Revision 1, November 27, 2012, Section 4.6.2</td></tr>
</table>

(24) Waste certification procedures: CCP-TP-530 CCP RH TRU Waste Certification and WWIS/WDS Data Entry Revision 11, June 19, 2013			
(25) **Required Waste Stream Information**			
(25A) Area(s) and building(s) from which the waste stream was generated: CCP-AK-SRS-600 Revision 1, November 27, 2012, Section 5.1			
(25B) Waste stream volume and time period of generation: CCP-AK-SRS-600 Revision 1, November 27, 2012, Section 5.2			
(25C) Waste generating process description for each building: CCP-AK-SRS-600 Revision 1, November 27, 2012, Section 4.7			
(25D) Waste Process flow diagrams: CCP-AK-SRS-600 Revision 1, November 27, 2012, Figures 8, 9, 10, 11, 12, and 13			
(25E) Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-SRS-600 Revision 1, November 27, 2012, Section 5.4			
(25F) Waste Material Parameter Weight Estimates per unit of waste: See Table entitled "Waste Stream SR-RH-221H.01 Waste Material Parameters" in the Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01			
(26) Which Defense Activity generated the waste:			
	Weapons activities including defense inertial confinement fusion		Naval Reactors development
	Verification and control technology	X	Defense research and development
	Defense nuclear waste and material by products management	X	Defense nuclear material production
	Defense nuclear waste and materials security and safeguards and security investigations		
(27) **Supplemental Documentation**:			
(27A) Process design documents: See D021, D026, D048, D049, D052, D054, D055, D058, D061, D115, D120, M061, in Summation of Aspects of AK Summary Report : Waste Stream SR-RH-221H.01, Source Documents			
(27B) Standard operating procedures: See C055, C063, C071, D018, P001, P003, P004, P007, P007A, P014, P015, P016, P018, P022, P023, P024, P025, P026, P027, P031, P033, P034, P037, P038, P042, P045, P046, P047, P048, P049, P050, P051, P052, P054, P055, P056, P057, P058, P059, P061, P062, P063, P064, P067, P069, P070, P072, P073, P076, P077, P078, P081, P082, P083, P084, P088, P089, P090, P091, P092, P093, P094, P096, P101, P103, P104, P105, P106, P107, P108, P109, P110, P111, P112, P113, P119, P120, P121, P122, P125 In Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01, Source Documents			
(27C) Safety Analysis Reports: See D003, D009, D020, D030, D056, D116, in Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01, Source Documents			
(27D) Waste packaging logs: See D015, M014, M015, M023, M027, M066, M115, M125, M127, in Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01, Source Documents			
(27E) Test plans/research project reports: See D019, D043, D046, D053, D090, D098, D108, D114, D127, M131 in Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01, Source Documents			
(27F) Site databases: See M052, M056, M066, In Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01, Source Documents			
(27G) Information from site personnel: See C088, C090, C091, C093, C094, C098, C104, C105, C116, C136, C146, C150, C152, C156, C157, C158, C164, C165, C178, In Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01, Source Documents			
(27H) Standard industry documents: See C045, C046, C047, C048, C054, C129, C161, C162, D035, D037, D038, in Summation of Aspects of AK Summary Report :Waste Stream SR-RH-221H.01, Source Documents			
(27I) Previous analytical data: See D005, D005A, D050, D060, M014, M015, M030, M099, M115, M125, M127, M169, in Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01, Source Documents.			

(27J) Material safety data sheets: See M051, M134 in Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01, Source Documents.	
(27K) Sampling and analysis data from comparable/surrogate Waste: NA	
(27L) Laboratory notebooks: See M012, M058, M063, M073, In Summation of Aspects of AK Summary Report: Waste Stream SR-RH-221H.01, Source Documents	
Confirmation Information	
(28)	Radiography: CCP-TP-053 *CCP Standard Real-Time Radiography (RTR) Inspection Procedure* Revision 14, September 25, 2013
	Visual Examination: NA
(29) Comments: For a list of the waste characterization procedures used and date of respective procedures see the list of procedures on the attached CIS.	

Reviewed by AK Expert: **YES** [X] **Date:** **11/13/13**

Reviewed by STR (if necessary): **YES** [ ] **N/A** [X] **Date:** ______

Waste Stream Profile Form Certification:

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Irene Joo (signature)	Irene Joo	1/6/14
Signature of Site Project Manager	Printed Name	Date

1. This waste stream consists of 17 55-gallon drums that will be loaded into 6 RH canisters.

CHARACTERIZATION INFORMATION SUMMARY

WSPF # SR-RH-221H.01

Lot 1

TABLE OF CONTENTS

CCP Characterization Information Summary Cover Page

Waste Stream #	SR-RH-221H.01	Lot #:	1
AK Expert Review:	Kevin Peters	Date:	1/6/14
SPM Review:	Irene Joo	Date:	1/6/14

SPM signature certifies that through Acceptable Knowledge testing and/or analysis that the waste identified in this summary is not corrosive, ignitable, reactive, or incompatible with the TSDF.

A summary of the Acceptable Knowledge regarding this waste stream containing specific information about the corrosivity, reactivity, and ignitability of the waste stream is included as an attachment to the Waste Stream Profile Form. By reference, that information is included in this lot.

List of procedures used:

Real-Time Radiography (RTR)

CCP-TP-053	Rev. 14	09/25/13	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 13	05/14/13	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 12	08/22/12	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 11	07/20/11	CCP Standard Real-Time Radiography (RTR) Inspection Procedure
CCP-TP-053	Rev. 10	03/04/11	CCP Standard Real-Time Radiography (RTR) Inspection Procedure

Visual Examination (VE):

NA	NA	NA

Project Level Data Validation / DQO Reconciliation:

CCP-TP-001	Rev. 21	06/06/13	CCP Project Level Data Validation and Verification
CCP-TP-001	Rev. 20	09/27/12	CCP Project Level Data Validation and Verification
CCP-TP-001	Rev. 19	12/29/10	CCP Project Level Data Validation and Verification
CCP-TP-002	Rev. 26	06/19/13	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-002	Rev. 25	02/11/13	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-002	Rev. 24	12/28/11	CCP Reconciliation of DQOs and Reporting Characterization Data
CCP-TP-005	Rev. 26	08/12/13	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 25	06/19/13	CCP Acceptable Knowledge Documentation
CCP-TP-005	Rev. 24	11/28/11	CCP Acceptable Knowledge Documentation
CCP-TP-530	Rev. 11	06/19/13	CCP RH TRU Waste Certification and WWIS/WDS Data Entry
CCP-TP-530	Rev. 10	04/25/11	CCP RH TRU Waste Certification and WWIS/WDS Data Entry

WAP Certification:

CCP-PO-001	Rev. 21	05/31/13	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-001	Rev. 20	06/16/11	CCP Transuranic Waste Characterization Quality Assurance Project Plan
CCP-PO-004	Rev. 34	08/29/13	CCP/SRS Interface Document
CCP-PO-004	Rev. 33	06/19/13	CCP/SRS Interface Document
CCP-PO-004	Rev. 32	10/25/12	CCP/SRS Interface Document
CCP-PO-004	Rev. 31	10/01/12	CCP/SRS Interface Document
CCP-PO-004	Rev. 30	10/17/11	CCP/SRS Interface Document

WAC Certification:

CCP-PO-002	Rev. 27	05/31/13	CCP Transuranic Waste Certification Plan
CCP-PO-002	Rev. 26	07/14/11	CCP Transuranic Waste Certification Plan

CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

Waste Stream: # SR-RH-221H.01 Lot # 1

Container ID Number	Historical Container ID	NDA BDR or Radiological Characterization BDR	RTR BDR	VE BDR	Load Management/ Overpack Yes
SR526226	NA	SRSRHDTC12001	SR4RTR0220	N/A	
SR513955	NA	SRSRHDTC12001	SR4RTR0220	N/A	
SR513961	NA	SRSRHDTC12001	SR4RTR0248	N/A	
SR526224	NA	SRSRHDTC12001	SR4RTR0220	N/A	
SR526264	NA	SRSRHDTC12001	SR4RTR0220	N/A	
SR526263	NA	SRSRHSTC12002	SR4RTR0248	N/A	
SR526227	NA	SRSRHDTC12001	SR4RTR0248	NA	
SR526225	NA	SRSRHDTC12003	SR4RTR0249	N/A	
SR522989	NA	SRSRHDTC11003	SR4RTR0249	NA	
SR570547	NA	SRSRHDTC11003	SR4RTR0196	N/A	
SR570548	NA	SRSRHDTC11003	SR4RTR0196	NA	
SR570546	NA	SRSRHDTC12001	SR4RTR0248	N/A	
SR570545	NA	SRSRHDTC12001	SR4RTR0220	NA	

[signature]
Signature of Site Project Manager

Irene Joo
Printed Name

1/6/14
Date

CCP RTR/VE Summary of Prohibited Items and AK Confirmation

Waste Stream Number: SR-RH-221H.01 Lot #: 1

Container Number	RTR Prohibited Items [a,b]	Visual Examination Prohibited Items [a,b]	Does the Physical Form of the Waste Match the Waste Stream Description as Determined by AK
See correlation of container ID numbers for list of remaining drum numbers in this Lot.	None of the containers in this Lot had prohibited items identified during Real Time Radiography Examination.	Visual Examination technique was not used on any of the containers in this Lot.	The physical form of the waste found in all the containers in this lot match the Waste Stream Description as Determined by AK.
a. See Batch Data Reports b. If AK has assigned U134 to this waste stream, then any liquids in these containers are prohibited items (not acceptable by the TSDF).			
Justification for the selection of RTR and/or VE: RTR was selected as the characterization method for this lot because the waste was previously packaged and RTR meets all the Data Quality Objectives for NDE for the waste stream SR-RH-221H.01.			

[signature] Irene Joo 1/6/14
Site Project Manager Signature Printed Name Date

CCP Reconciliation with Data Quality Objectives

WSF# SR-RH-221H.01 Lot # 1

Sampling Completeness

VE
Number of Valid Samples: NA Number of Total Samples Analyzed: NA
Percent Complete: NA (QAO is 100%)

RTR
Number of Valid Samples: 13 Number of Total Samples Analyzed: 13
Percent Complete: 100 (QAO is 100%)

NDA
Number of valid samples: 13 Number of Total Samples Analyzed: 13
Percent Complete: 100 (QAO is 100%)

	Y/N/NA	Reconciliation Parameter		
1	Y	Waste Matrix Code.		
2	Y	Waste Material Parameter Weights.		
3	Y	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.		
4	Y	The TRU activity reported in the BDRs for each container demonstrates with a 95% probability that the container of waste contains TRU radioactive waste.		
5	N	AK Sufficiency. Is there an approved AK sufficiency Determination for this waste stream?		
6	Y	The data demonstrates whether the waste stream exhibits a toxicity characteristic under Title 40 Code of Federal Regulations (CFR), Part 261, Identification and Listing of Hazardous Waste, Subpart C, Characteristics of Hazardous Waste.		
7	Y	Does the waste stream contain listed waste found in 20.4.1.200 NMAC incorporating 40 CFR Part 261, Subpart D, Lists of Hazardous Wastes.		
8	Y	Waste stream can be classified as hazardous or nonhazardous at the 90-percent confidence level.		
9		The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in CCP-PO-001 Sections C3-1 through C3-2 prior to submittal of a waste stream profile form for a waste steam or waste stream lot.		
		Completeness	Comparability	Representativeness
	Radiography	Y	Y	Y
	VE	NA	NA	NA

Comments: N/A

[signature] Irene Joo 1/6/14
Signature of Site Project Manager — Printed Name — Date

SUMMATION OF ASPECTS OF AK SUMMARY REPORT: WASTE STREAM SR-RH-221H.01

Overview:

Waste stream SR-RH-221H.01 consists of remote handled (RH) transuranic (TRU) heterogeneous debris waste generated from the HB-Line (HBL) and H-Canyon at the Savannah River Site (SRS). The primary function of H-Canyon has been the chemical separation of the neptunium and plutonium isotopes (Np-237 and Pu-238) from old SRS reactors and from uranium and plutonium scrap material received from off-site sources for dissolution and recycle to canyon facilities. The HBL also receives plutonium and neptunium solutions and converts them to solid oxides.

The primary mission of the HBL, beginning as early as 1954, was to produce plutonium (Pu-239) for use in the assembly of atomic weapons. By the 1960s, other materials such as Pu-238 were produced for defense use. Neptunium was also produced and ultimately incorporated in new reactor targets where it was re-irradiated for production of Pu-238. Therefore, TRU wastes generated by HBL operations are contaminated with materials from defense nuclear materials productions and defense research and development.

This summation of the Acceptable Knowledge (AK) Summary Report includes information to support Waste Stream Profile Form (WSPF) number SR-RH-221H.01, for mixed heterogeneous debris waste generated at SRS. The primary source of information for this Summation is CCP-AK-SRS-600, *Central Characterization Program Acceptable Knowledge Summary Report For Savannah River Site, Remote-Handled Transuranic Waste, Waste Streams: SR-RH-221H.01, SR-RH-221H.02*, Revision 1, November 27, 2012.

Waste Stream Identification Summary:

Waste Stream Name:	HBL Heterogeneous RH Debris
Waste Stream Number:	SR-RH-221H.01
Dates of Waste Generation:	July 1977 to November 1990[1]
Waste Stream Volume – Current:	17 55-gallon drums (6 canisters)
Waste Stream Volume – Projected:	None[1]
Summary Category Group:	S5000 – Debris Waste
Waste Matrix Code Group:	Heterogeneous Debris Waste
Waste Matrix Code:	S5400
RH TRU Waste Content Codes:	SR321, SR322, and SR325
Annual Transuranic Waste Inventory Report Identification Number:	SR-RH-221H.01

1 Even though no additional drums are expected to be added to RH waste stream SR-RH-221H.01, any container from contact-handled (CH) waste stream SR-W027-221H-HET generated between August 1973 and April 2013 determined to be RH waste could be included in this waste stream.

Waste Stream Description and Physical Form:

Waste stream SR-RH-221H.01 includes dry heterogeneous organic and inorganic debris. The organic debris includes plastic, bags, personal protective equipment (gloves, shoe covers, lab coats, and plastic suits), plexiglas, wipes, labware, cardboard, wood, absorbed oil, paper, and other "job control" type waste. Job control waste generally consists of paper, cloth, wood, plastic, rubber, glass, ceramic, and metal. The waste may also include small amounts of inorganic debris such as metal components (hand tools, motors, and small equipment), metal hardware and fittings, sealed sources, crucibles, glass, floor sweepings, and absorbent materials. In addition, small quantities of poly bottles (100-milliliters [ml], 500-ml, 2-liter) containing immobilized liquids (absorbed acids and organic liquids) are also present. Examples of container-specific waste items described on generator and packaging forms:

- Cellulosic items such as wipes, swipes, rags, leather gloves, spill pillows, wood, cardboard, paper, rope, mops
- Plastic items such as tape, suits, shoe covers, bags, tubing, Plexiglas, buckets, bottles, containers
- Equipment and electrical devices such as heat guns, rotometers, calculators, pumps, motors, ultrasonic cleaners
- Other metals such as alkaline batteries, lead bricks, pellets, shavings, lead-lined gloves, sealed sources (e.g., Pu-238)
- Iron-based metals, such as piping, hoods, metal ductwork, tools, scissors, shears, saw blades, funnels, scales, weights, cans, lids, containers, flanges, valves, fittings, clamps, gauges, metal locks, wire, hardware (e.g., nuts, bolts, screws), ladders, scaffold material
- Aluminum-based metal items, such as foil
- Absorbed liquids, absorbent (e.g. Celite), soda ash
- Rubber, such as gloves, o-rings
- Filters, such as high efficiency particulate air (HEPA) filters, agitator filters
- Other inorganics, such as vials, glass labware, floor tiles, crucibles, floor sweepings, sand, Insulation, fluorescent light bulbs

Waste stream SR-RH-221H.01 is comprised primarily of organic and inorganic debris materials. Therefore, Waste Matrix Code S5400, Heterogeneous Debris, is assigned to this waste stream. This waste stream could also contain 100-ml, 500-ml, and 2-liter poly bottles containing liquids (e.g., absorbed acids and organic liquids) that have been immobilized using absorbent products; however, no individual drum will contain greater than 50 percent homogeneous solids.

Waste Stream SR-RH-221H.01 meets the *Waste Isolation Pilot Plant Hazardous Waste Facility Permit*, *Waste Analysis Plan* and the *Remote-Handled TRU Waste Characterization Program Implementation Plan* waste stream definitions because the waste has a common physical form (debris), and contains similar hazardous and radiological constituents as a result of the waste being generated from a single activity (HBL facility operations and associated maintenance and deactivation operations).

Point of Generation:

Location

Waste stream SR-RH-221H.01 was generated at SRS in Aiken, South Carolina.

Area and/or Buildings of Generation

Waste stream SR-RH-221H.01 was generated at the HBL in the H-Canyon separations facility located in the 200-H Area.

Generating Processes:

Description of Waste Generating Processes

HBL has consisted of three major operations in both the Old and New HB-Lines: Scrap recovery, Neptunium Oxide production, and Plutonium Oxide production. The New HB-Line also has a laboratory that generated TRU waste (References C063, C066, D005, D054, D099, D113, D116, M069). HBL generates TRU waste containing plutonium and neptunium during the use of gloveboxes, contamination control huts, and from decontamination processes. TRU waste containing Pu-238, Np-237, Pu-239, and other radionuclides was also generated during decontamination operations, replacement of equipment, maintenance, inspection, and sampling (Reference D034).

Old HB-Line Waste Generating Processes

The Old HB-Line operated from 1963 to 1984 producing Pu-238 material for National Aeronautics and Space Administration programs as well as defense-related materials. It was designed to receive radionuclides in dilute acid (e.g., nitric acid) solutions from the fuel reprocessing canyon, precipitate them as oxalates, and then calcine them in a furnace to a solid oxide form (References D004, D062). In addition to Pu-238 and Np-237, the facility processed other plutonium and uranium isotopes (Pu-239, U-233, and U-235) (References D004, D095). The Old HB-Line had three distinct facilities to process Np-237, Pu-238, and recoverable scrap material (References C093, D052).

Dissolution of these materials in the H-Canyon involved fuel elements and assemblies being transported from the storage area or directly from cask cars, charged to the dissolver, and dissolved in nitric acid solution to provide an aqueous solution suitable for subsequent processing and separation steps. Typical dissolution included uranium metal with aluminum clad slugs, uranium-aluminum alloy fuel, and zirconium and stainless steel clad fuels (Reference D124).

Scrap Recovery Process

The Scrap Recovery Process recovered U-235, Pu-238, and Np-237 from local and off site scrap by dissolving the scrap and transferring the solution to the canyon for reprocessing (Reference D052). The recovery process normally consisted of opening and examining contents of scrap containers, removing extraneous materials, screening, size reduction, oxidation, leaching, and dissolution (Reference D052). Precipitation and ion exchange capabilities are also available. Solutions may require diluting to obtain nitrate solutions suitable for further processing (Reference D019).

The scrap was inspected and extraneous material removed. The scrap was then weighed and pulverized for dissolution. The material was manually added to the dissolver, which contained nitric acid, potassium fluoride and aluminum nitrate (References D006, P105). The dissolver solution was then filtered and analyzed for Pu-238 prior to reprocessing. Insoluble material in the filter boat was either recycled or discarded depending upon its plutonium content. U-235, Pu-239, and Np-237 were recovered from scrap consisting mainly of uranium, plutonium, and neptunium oxides of various compositions. The scrap is weighed and added to a solution of nitric acid/potassium fluoride (potassium fluoride/aluminum nitrate (References D006, P038). The solution was cooled, filtered, sampled, and analyzed for U-235 and Pu-239 prior to reprocessing.

Scrap was occasionally received with a significantly different composition than that normally processed. Non-routine scrap required a special evaluation to determine a safe recovery procedure. Examples of special recovery scrap processed in HBL include scrap containing molybdenum, zirconium, or beryllium. Molybdenum scrap was dissolved with ferric nitrate. Scrap containing zirconium metal or alloy was processed with fluoride (Reference D006).

Neptunium Process

The Neptunium Process received Np-237 solution separated by canyon operations in F and H Areas. The process purified and concentrated the neptunium solutions using anion exchange, precipitation, and calcination. The product was ultimately incorporated in new reactor targets and re-irradiated for the production of Pu-238 (References D019, D052).

HBL received Np-237 nitrate from three sources: H-Canyon Frames Process, H-Canyon Hydrazine Mononitrate Process, and the F-Canyon Purex Process. These feed solutions were sampled and analyzed for neptunium content and acidity and then combined with feed solutions from other processes. Feed solutions were adjusted by adding nitric acid, ferrous sulfamate, and hydrazine mononitrate (References D019, D052). Hydrazine mononitrate was added to the solution after it was sampled and analyzed (Reference D052).

Plutonium Process

The plutonium Process received separated Pu-238 nitrate solutions and converted them to plutonium dioxide powder by precipitation and calcination (Reference D052). The plutonium product was shipped to other facilities where it was fabricated into heat sources for radioisotope thermoelectric generators (References D052, D056). Plutonium was precipitated, filtered, and calcined to plutonium dioxide in air.

HBL received high assay and low assay Pu-238 nitrate solutions from H-Canyon operations. The high assay plutonium solutions accounted for ~99 percent of the Pu-238 processed in HBL. Low assay Pu-238 was recovered from irradiated fuel assemblies of enriched uranium. The recovered product was decontaminated and purified in the H-Canyon, and was transferred to HBL. Low assay plutonium solution contained plutonium in nitric acid (Reference D052).

High assay Pu-238 was recovered from irradiated neptunium target tubes. The plutonium was separated from the dissolver solution and purified by ion exchange in the H-Canyon Frames Process. The high assay solution was transferred from H-Canyon to an HBL receiving and blending tank. The solution was then blended to isotopic specifications, adjusted, and transferred to the precipitator feed tank (Reference D052).

Low assay plutonium solution was blended with high plutonium solution to give an isotopic concentration of 80 to 81 percent Pu-238, which was suitable for fabrication of heat sources.

The acidity of the blend was adjusted by using nitric acid. Additional adjustments used ascorbic acid and hydrazine mononitrate. Plutonium oxalate was precipitated and filtered from the adjusted feed solution prior to calcination. When the precipitation was complete, the slurry was filtered to recover plutonium oxalate. The precipitate cake was washed with oxalic acid, hydrazine mononitrate, ascorbic acid, and nitric acid, calcined to convert to plutonium dioxide.

New HB-Line Waste Generating Processes

The New HB-Line, located on the fifth and sixth levels of H-Canyon, was designed to replace the aging Old HB-Line production facility (References D003, D056, D116). Built in the early 1980s in part of the H-Canyon Building, HBL is also a large, reinforced concrete structure. New HB-Line consists of the following (References D005, D005A, D050, D052, D058, D067, D092):

- Scrap Recovery Facility (Phase I)
- Neptunium Oxide Facility (Phase II)
- Plutonium Oxide Facility (Phase III)
- Waste Handling Facility, which was converted to an analytical laboratory operating since 1991 (References C105, D005)
- An office building
- Areas for support processing and service equipment

Chemicals used in New HB-Line processing facilities are nitric acid, potassium fluoride, aluminum nitrate, sodium nitrite, ferrous sulfamate, ascorbic acid, hydrazine mononitrate, and oxalic acid. All acid spills are neutralized prior to being disposed. Solid hydrazine is never brought into the HBL Facility. It is delivered as 30 percent hydrazine mononitrate solution in drums. Suspected hydrazine mononitrate spills are tested and cleaned up by Industrial Hygiene (Reference D050).

Scrap Recovery Facility (Phase I)

Phase I operations include opening, repackaging, screening, size reducing and dissolving scrap (References D005, D050). The facility is designed to receive and process material containing isotopes of plutonium, uranium, and neptunium from various on-site and off-site locations. Process materials can be in the form of solid or powdered oxides, pure metals, and mixed or alloyed with other metals. Phase I operations recover U-235, Pu-239, Pu-238, and Np-237 from scrap material and produce nitrate solutions for purification by anion exchange in HBL or solvent extraction in H-Canyon (References D003, D005, D058, D116). The process involves introducing prepared and assayed scrap into vessels containing nitric acid, filtering the dissolved product, and then educting the product with dilute nitric acid to the appropriate H-Canyon vessel (References D003, D058). The following campaigns were processed through New HB-Line Scrap Recovery: enriched uranium/plutonium material; Pre-Cassini Pu-238; Cassini Pu-238; high assay plutonium; Post-Cassini Pu-238; low assay plutonium (LAP); Pu-239 FB-Line sweepings; and enriched uranium/depleted uranium/Pu-239 (References D110, D114).

The Phase I cold feed preparation (CFP) area, provides Phase I with a remote site for chemical preparations and metered quantity introduction to the process line (References D003, D058). Chemicals used in Phase I include nitric acid, potassium fluoride, aluminum nitrate, and ferric nitrate. After the conditioned scrap is dissolved, it is filtered and then educted to H-Canyon (References D050, D058). Aluminum nitrate is stored and prepared separately from flammable and combustible materials in the CFP. LAP and FB-Line sweepings were also processed in this facility (Reference D005). LAP, FB-Line sweepings, plutonium-beryllium material from FB-Line, and other FB-Line scrap materials were also processed in this facility (References D005, D112, D113, D115).

The HBL Phase I Scrap Recovery Facility was processing scrap in 2003 referred to as desicooler material, which was a uranium-aluminum scrap with trace amounts of plutonium, neptunium, and americium. Most of this material was left over from a uranium oxide scrap recovery program that began in 1972 with material from Oak Ridge National Laboratory and Rocky Flats. Several cans of this material were processed under normal scrap recovery operations in 2003. However, a decision was made to stabilize the remaining material with Portland cement and water in 1-gallon paint cans to reduce the attractiveness level of the material (References D107, D108).

HBL also processed plutonium and uranium scrap metal referred to as 3013 material. Phase I Scrap Recovery and Phase III facilities are being utilized for this process. The metal/alloy materials in the 3013 material contain impurities such as vanadium, tantalum, zirconium, beryllium, and molybdenum. A shear and furnace station was installed in part of the Phase III glovebox line in 2006 to support the 3013 Processing Project. Size reduction of these materials in a hydraulic shear may be necessary prior to introducing the materials into the dissolver. This will allow for the dissolver charge to be prepared at this location and transported to Phase I or to H-Canyon. Material containing hazardous quantities of zirconium metal are placed in the furnace at an elevated temperature for oxidation in order to preclude a violent chemical reaction of this material when placed in the dissolver (Reference D116).

The dissolution of composite materials containing plutonium and tantalum metals was being performed in Phase I of the HBL Facility in 2007 for subsequent disposition through the H-Canyon facility. The material is first rinsed with process water, placed into the dissolver using a nitric acid solution containing potassium fluoride and then burned, in part to destroy classified information. The first dissolution processes resulted in the precipitation of a fluoride salt containing plutonium which required further dissolution of the salt using aluminum nitrate and a longer heating time. As a result, the process was modified which resulted in more favorable outcomes (Reference D120).

<u>Neptunium Oxide Facility (Phase II)</u>

The original intent of Phase II was to convert nitrate solutions of neptunium into stabilized Np-237 oxide (References D005, D049). However, no operations occurred in this facility until late 2001, when nitrate solutions of Pu-239 were converted into plutonium oxide powder suitable for dissolution, blending, or long-term storage (References D049, D058, M022). Phase II shifted to neptunium processing in 2004. Neptunium solutions that have been in storage since the 1980s are being converted into an oxide and shipped to the Idaho National Laboratory (INL) (References D005, D111, D112, D113, D116).

Phase II consists of two processing lines that can process either plutonium or neptunium. The operations include transferring plutonium or neptunium nitrate solutions from H-Canyon vessels to receipt tanks. The solutions are then processed through ion exchange columns to concentrate, and precipitation stages that produce oxalate cake after filtration. The cake is calcined and packaged as the final product (References D005, D049, D058, D116).

The chemicals used in Phase II include nitric acid, ferrous sulfamate, sodium nitrite, ascorbic acid, hydrazine mononitrate, oxalic acid, and potassium permanganate. Aqueous nitric acid is mixed into an actinide feed solution and then chemically adjusted with ferrous sulfamate (References D005, D049, D058, P081).

Plutonium Oxide Facility (Phase III)

Phase III was designed to convert Pu-238 nitrate solutions to plutonium oxide powder suitable for fabrication into heat sources, but has not been in operation since 1997 (References D061, D058). The original mission for Phase III was to produce Pu-238 oxide for the Los Alamos National Laboratory (References D005, D050).

In 1985, the Pu-238 nitrate solution sent to Phase III came from the H-Canyon Frames Process HBL, which processed both low assay and blended material made from low and high assay material. Low assay Pu-238 was recovered from irradiated uranium fuel assemblies. High assay Pu-238 was recovered from irradiated neptunium target tubes. The targets were removed from the reactor and, after a cooling period, shipped to the separations facility. The targets were placed in a vessel, the cladding was removed, and the uranium metal and neptunium were dissolved. An ion exchange process separated the fission products, uranium, Np-237, and Pu-238. After separation in H-Canyon, the Pu-238 is in a nitrate form in nitric acid. It is then transferred to HBL Phase III, where it is converted into an oxide (Reference C139).

The new plutonium oxide process in Phase III was an improved version of the Old HB-Line plutonium oxide process used since 1961 (Reference D056). After Pu-238 nitrate solutions were received from the H-Canyon Frames Process, the solution was adjusted using ascorbic acid and hydrazine mononitrate. Oxalic acid was added to form plutonium oxalate. The plutonium oxalate was then calcined in a furnace to produce the Pu-238 oxide powder (References M061, M062). Finally, the Pu-238 oxide powder was packaged and shipped to another DOE facility (References D005, D050, D056). Pu-242 was precipitated in the same manner (References D050, D061). The brief Pu-242 campaign did not use ascorbic acid or hydrazine mononitrate (Reference D050).

The Phase III process lines are serviced with chemical solutions from the Phase II CFP area (Reference D058). The chemicals used in Phase III included nitric acid, oxalic acid, potassium permanganate, ascorbic acid, and hydrazine mononitrate (Reference M061). The oxalic acid solution, and potassium permanganate used in the Phase III process was also prepared in the CFP.

Surveillance and maintenance activities in this facility continue to generate TRU waste contaminated with a heat-source (Pu-238) distribution. The Pu-242 formerly processed in this facility has been removed, and only residual amounts of Pu-242 remain (Reference D005).

HBL is currently processing plutonium and uranium scrap metal referred to as 3013 material. Phase I Scrap Recovery and Phase III facilities are being utilized for this process. During the 3013 Campaign, the 3013 cans are opened and destructive analysis of the plutonium oxide is performed prior to the can being shipped to the HBL for dissolution in Phase I. Prior to dissolution, the plutonium-oxide may be washed utilizing an oxide washer in order to reduce the chloride content. The purpose of this is to reduce stress corrosion cracking of the processing equipment in Phase I (References D120, P119, P120, P121, P122, P125).

Repackaging of solid waste and solid materials containing enriched uranium/depleted uranium/natural uranium, plutonium, and/or neptunium is now permitted in the Phase III process line or confinement enclosures (e.g., glove-bags or huts) (Reference D116).

Other Facilities

Also contained within the HBL are a Waste Handling Facility and an area known as Room 410N. The Waste Handling Facility also contains the Analytical Laboratory. Although this facility was originally designed to prepare contaminated items for TRU waste disposal, it currently functions only as an Analytical Laboratory for analyzing samples and has been operational since 1991 (References D005, D058). Process operations in the Old HB-Line were permanently suspended in 1983, but the process equipment in Room 410N is used as part of the Phase II process operation (References D058, D116).

Old HB-Line Decontamination and Removal (D&R)

The D&R process for the Old HB-Line began in about 1982, while the facility was still operational. A report issued by SRS in early 1994 (Reference D004) stated that a portion of the Old HB-Line (Neptunium Process and Scrap Recovery) had been undergoing dismantlement and decontamination (D&D) intermittently over the past nine years and, at the time of the report, the facility had been cleaned. The remainder of the facility was scheduled to be cleaned over the following three years. However, according to the August 2005 HBL characterization plan and the August 2006 Safety Analysis Report (SAR), the third and fourth levels are in various stages of decommissioning and deactivation and continue to generate TRU waste (References D005, D116).

The D&R project followed a four phase process. The first step was the removal of all non-contaminated equipment, which also included flushing tanks, piping, and sumps.
In step two, process cabinets were emptied and cleaned. Cabinet interiors were decontaminated to a practical limit. Then the cabinets were painted to affix contaminants. The third step was the cabinet removal stage, where adjoining cabinets were separated and cut into sections to allow for packaging. Since the area was highly contaminated with plutonium, processing equipment was contained in gloveboxes or cabinets with controlled ventilation, to assure personnel protection. The last step was the decontamination of the vacated areas of the facility to as low a level of radioactivity as economically practicable. Tasks performed in this effort included painting walls, laying new floor tiles, and reinstallation of services such as lights, ventilation, and alarms. The Kelly decontamination system, which used a combination of steam and chemicals, was used to decontaminate large concrete areas. Contaminated wash water was pumped to the adjacent canyon for evaporation and transfer to the waste tanks. A Bead Blaster was used to remove deeply penetrated contamination from large areas of concrete floor. "Tacky" wipes were used to decontaminate smooth surfaces (Reference D004).

Associated Maintenance and Housekeeping Activities

Maintenance activities conducted on HBL included the following (References C098, C129, D034):

- Lead-lined glove replacements (periodically and as needed)
- Repair of leaks
- Filter change-outs (References M023, P007, P007A, P031, P037, P084, P101)
- Changing panels on cabinets and huts
- Equipment repair (e.g., valve replacement)
- Inspection and cleaning of exhaust ducts to remove any plutonium accumulation (during January 1990 shutdown)

Routine housekeeping activities conducted by Operators included the following:

- Sump cleanout (Reference D090)
- Floor sweeping (References C031, C039, C117)
- Absorption of liquids
- Construction, breakdown, and disposal of huts adjacent to cabinets (References D067, P023)
- Bagging trash out of gloveboxes and cabinets (References C044, C131, M046, P022)
- Decontamination (References M012, P049)

All of these activities generated TRU waste throughout the time period of waste generation. Some examples of waste-generating maintenance and housekeeping activities are provided below.

Sump Cleanout

Cabinet sumps were physically cleaned of items that may have fallen into them, such as vials and tape, including the filtrate cabinet and product hold cabinet sumps. Dissolvers were also emptied. The sumps were then flushed with nitric acid. The dissolver was also filled to its limit with nitric acid, sampled and discharged. Sumps required to be physically cleaned in the Phase III facility included the receipt cabinet, the precipitator, and the filtrate cabinets. Flush solutions were ultimately sampled and transferred to H-Canyon (Reference P033). The Old HB-Line sumps were not cleaned as often as in the New HB-Line, but sumps were usually flushed out and cleaned between isotopic campaigns; cabinets were wiped down, and everything was removed (Reference C105). The rinsed wet nitric acid wipes that were used to clean the sumps were radiologically surveyed and either discarded or held for recovery of material (Reference D090).

Floor Sweeping Cleanup

Materials would be mixed with vermiculite to assure no free liquids existed (References C031, C117). When neoprene glovebox gaskets covering the points where cabinets joined together would fail, neptunium sweepings were generated (Reference C105). The radioactive glovebox sweepings were recycled when practical to do so, (Reference D005) and were collected and put through Scrap Recovery.

Waste Stream Material and Chemical Inputs

The following table identifies the Resource Conservation and Recovery Act (RCRA) toxicity characteristic and listed constituents identified in this waste stream, and Environmental Protection Agency (EPA) Hazardous Waste Number (HWN) assigned for each constituent.

Toxicity Characteristic and Listed Constituents in Waste Stream SR-RH-221H.01

RCRA Constituent	Use/Description	AK Source	EPA HWNs
Cadmium	Cadmium plates used in HBL vessel vent system. Historically identified as a contaminant of mixed waste.	C002, C098, C139, D067, P015, P026, P034, P073, P103	D006
Carbon tetrachloride	Historic HBL inventory chemical. Historically identified as a contaminant of mixed waste.	C104, C152, C155, D018, D059, D075, P052, P061	F001/D019
Chloroform	Historic HBL inventory chemical. Historically identified as a contaminant of mixed waste.	C104, C152, C155, D018, D059, D075, P052, P061	D022
1,1-Dichloroethylene	Historic HBL inventory chemical. Historically identified as a contaminant of mixed waste.	D018, D075, P052, P061	D029
Hydrazine	Used in Scrap Recovery anion exchange and neptunium and plutonium precipitation.	C098, C105, C136, C152, D007, D019, D050, D052, D055, D056, M061	U133
Lead	Sources of lead-contaminated waste include leaded rubber gloves, lead-impregnated vinyl aprons, and metallic lead waste (e.g., bricks, sample carriers) used as shielding. Historically identified as a contaminant of mixed waste.	D003, D018, D052, D058, D067, M014, M066, P026, P052, P096, P103	D008
Mercury	Component of fluorescent light bulbs, thermometers, and manometers. Historically identified as a contaminant of mixed waste.	C067, C156, D052, M037, M098, P015, P026, P034, P103	D009
Methyl ethyl ketone	Ingredient in EZ Weld Gray Polyvinyl chloride Cement.	C002, C017, C032, M051	F005
Tetrachloroethylene	Historically identified as a contaminant of mixed waste.	D018, D075, P052, P061	F001/F002/ D039
1,1,2-trichloro-1,2,2-trifuoroethane (Freon)	Decontamination and degreasing solvent on rags.	C006, C017, C083	F002
1,1,1-Trichloroethane	Ingredient in Raycohesive adhesive and Magnaflux cleaner used for clean-up and decontamination.	C017, C105, C152, D018, D075, M051, P052, P061	F001/F002
Trichloroethylene (Triclene)	Decontamination and degreasing solvent on rags. Historically identified as a contaminant of mixed waste.	C006, C083, C105, D018, D075, P052, P061	F001/F002/ D040
Vinyl Chloride	Historically identified as a contaminant of mixed waste.	C155, D018, D075, P052, P061	D043

RCRA Determinations

Historical Waste Management

The HBL waste has historically been managed in accordance with the generator site requirements and in compliance with the requirements of the South Carolina Department of Health and Environmental Control. Based on historical waste management, the containers in this waste stream were managed as non-hazardous and hazardous. A review of available AK documentation has determined that this waste is hazardous.

SRS began to manage TRU mixed waste under RCRA beginning in June 1987 (Reference C088), around the time when they began implementing a TRU Waste Certification Program, of which HBL was a part, for waste to be disposed at the Waste Isolation Pilot Plant (WIPP) (Reference C105). Under this program, HBL was audited in 1988-89, and began "to do better segregation of waste" and package and characterize it to meet program requirements, including segregating mixed waste from other TRU non-hazardous waste (Reference C105). From about 1986 forward, HBL waste generators were able to indicate HWNs applicable to the waste they were packaging on TRU Waste Package Data (TWPD) forms, except that they did not indicate F001-F005 HWNs for solvent-contaminated wipes or rags; a review of these forms from the 1986-1990 time period (References M014, M066) reveals that generators assigned the number D008 for lead. By 1988, under the TRU waste certification program, liquids and sludges were segregated from certifiable waste prior to bagout, as verified by x-ray (Reference D088). Hazardous materials that could be disposed of in TRU waste were listed in procedures or posted in work areas.

TRU waste management changes were made in January 1990 in response to regulatory concerns with the management of solvent rags and potentially other hazardous wastes (Reference C006). At this time, SRS waste-generating facilities were asked to identify chemical inventories (Reference C067). On January 19, 1990, the SRS, Environmental Protection Department (EPD) issued a memo summarizing recent regulatory guidance that would require considering solvent-contaminated rags/wipes to be hazardous under certain conditions. Affected SRS activities were anticipated to include decontamination or degreasing "using Freon, acetone, methanol, methylene chloride, and other RCRA-listed solvents…" as well as trichloroethylene-assisted decontamination activities (Reference C083). On January 25, 1990, the EPD issued guidance requiring generators to handle all rags and wipes as hazardous waste and noting that the guidance might affect decontamination, degreasing, lubricating, or any other activities that dissolved or mobilized other constituents (Reference C029). These memos were followed by two special procedures requiring that absorbent materials such as rags and wipes contaminated with F001-F005 solvents be classified as hazardous and that "use of unapproved solvents shall be discontinued except for Environmental Safety & Health (ES&H) purposes" (Reference C083). Waste generated prior to January 25, 1990, was to be segregated if it was suspected to be contaminated with solvents based on process knowledge.

Supplemental guidance issued on January 24, 1990, allowed rags contaminated with F003-listed solvents to avoid being considered hazardous provided that they did not contain free ignitable liquids (Reference C083). This policy was further supported in a February 6, 1990 memo outlining answers to generator questions regarding the solvent rag guidance and allowing the continued use of listed solvents such as Freon under certain conditions (Reference C083). As a result of this change, in October 1990, SRS Waste Management Operations stopped accepting newly generated waste until verification of a formal, auditable program to ensure proper management of hazardous and mixed wastes was completed for each generator (Reference C006). In addition, each Department was required to implement the site Blue Dot program for F-listed solvents and products containing Toxicity Characteristic constituents. This program required that a Blue Dot Identification sticker be placed on any product that contained RCRA-listed chemicals (References C006, C105, P003). The program was implemented as the primary control for chemical products that become hazardous waste upon disposal; however, U- and P-listed chemicals were not controlled under the Blue Dot program at this time (Reference D069).

An inventory conducted in January 1990 found hazardous chemicals stored in HBL with current Material Safety Data Sheet (MSDS) information available (References C017, M051). The January 25, 1990 SRS EPD guidance on solvent rags was supplanted in HBL in August 1991 by the Blue Dot program (References C090, D005, P003, P076). By procedure, non-hazardous substitutes were to be researched for all chemicals with hazardous constituents; if no substitute could be found and a Blue Dot chemical was used, "every attempt to use all the product shall be made," which HBL personnel recalled (References C105, P076). An example of the implementation of this procedure is the replacement of Magnaflux and SpotCheck with the non-hazardous chemical Magnaflux Spotcheck SDC-S (Reference M051). Also, the facility Chemical Coordinator was to be consulted to determine proper management of Blue Dot chemical-contaminated waste materials used for application or cleanup. Non-empty Blue Dot chemical containers were prohibited from being placed in waste containers (Reference P076). According to HBL personnel, a site wide program listed Blue Dot chemicals like Magnaflux (Reference C105). Under this program, nothing with a Blue Dot was supposed to be used in the cabinets or huts; however, White Dot chemicals were safe to use (Reference C105, D067). Procedures provided instructions to HBL waste generators on completing waste characterization forms such as the Radioactive Solid Waste Burial Ground Record and TWPD (References C014, P026, P073).

The actual implementation of this program through the 1990s is documented in HBL procedures. According to HBL Waste Operators, they did start to segregate solvent rags out of TRU waste and place them in separate drums. HBL personnel noted that ascorbic/oxalic acids were used for cleaning instead of solvents; as a result, no organic solvent-contaminated wipes from inside of gloveboxes should have been packaged in TRU waste containers (References C105, P033). By 1993, procedures stated that liquids were to be removed from waste rags contaminated with F-listed solvents and that rags with F003 solvents were to be segregated from other F-listed solvent rags. Waste categories and any HWNs were written on an Operational Safety Requirement (OSR) 29-14 Hazardous Waste Label (Reference P090).

A 1996 procedure (Reference P026) describes the only HBL mixed waste generated routinely as "lead lined gloves that have been used in process cabinets." The type and quantity of mixed wastes were to be specified on Waste Identification (Waste ID) Slips stored with waste in a satellite area until containers were filled (or 11 5-gallon drums had accumulated) and then moved to a staging area (Reference P096). Storage of mixed waste in separate satellite accumulation areas was also specified in low-level waste procedures (Reference P103). Hazardous waste labels were explicitly required for waste cuts of lead-lined gloves. The procedure listed potential mixed waste in several places, but the exhaustive list includes lead, mercury, cadmium, acid, nitrates, and oil as major chemicals from HBL (References M037, P026); the procedure identified acids and nitrates as non-hazardous, provided that they were solidified. An attachment in this procedure listed F001-F005 RCRA-regulated solvents and instructs "Using the MSDS chemical composition section, products must have greater than 10 percent of the following contaminants and be used as solvents to require a blue dot and have special disposal requirements." No mention of solvent rags was made in this attachment. Solvent waste was considered procedurally as a separate category of waste from glovebox and hut wastes. The following guidance on packaging solvent rags was provided: remove as much solvent as possible from the rags, contact the waste handling supervisor for solvent classification before disposal, segregate rags "permeated" with F003 solvents from rags "permeated" with other F-listed solvents, and identify the waste with a hazardous waste label listing the HWN (F001-F005)(Reference P026).

Consistent with this procedure, other 1996 procedures included Waste ID Slips or other generator waste characterization forms with spaces on which generators were to indicate Hazardous Materials present in the drum, with the following options: lead, oil, cadmium, mercury, calcium, and other (References P015, P034). A cabinet bag-port operation procedure and other later procedures specified that wastes were allowed to have only WIPP-acceptable EPA HWNs, although waste with other EPA HWNs could be accepted for storage with an approved deviation request (References P015, P094). In a 1997 procedure on packaging 55-gallon TRU waste drums, only the following options were included for labeling drums with hazardous South Carolina Department of Health and Environmental Control waste numbers: D001, D008, F002, F003, and other (Reference P014), although by October 1997, this list was replaced with guidance to contact the facility Generator Certification Official (GCO) for wastes other than leaded gloves. The term "mixed waste" also applied to TRU mixed waste (Reference P014). These procedures also continued to specify that drums containing mixed waste were to be stored in a separate Mixed Waste Staging Area (Reference P014).

According to Solid Waste Management (SWM) personnel, SRS waste generators started to assign F, U, P, and other HWNs to TRU waste after 1996. SRS had an agreement with the state regulator that it would manage waste with all possible applicable HWNs and remove HWNs if needed as characterization information was obtained (Reference C146).

Waste stream SR-RH-221H.01 contains waste generated in HBL prior to January 25, 1990. As such, HWNs historically applied to this waste stream have been assessed on the basis of HWNs applied by generators in the 1986-1990 time period on TWPDs (Reference M014) and HWNs applied by SWM to the entire pre-1990 inventory (References D018, D021, D034, D075, P052, P061.

The assignment of these HWNs was based on a review of chemical inputs to the waste generating operations and hazardous materials potentially contaminating the waste. In addition, MSDSs and other manufacturer information were obtained for the commercial products to determine the presence of RCRA regulated constituents.

The assignment of HWNs to waste stream SR-RH-221H.01 is based on the characterization of the corresponding CH waste stream SR-W027-221H-HET. Since this RH waste stream consists of drums originally included in the corresponding CH waste stream, the HWNs, with the exception of F003, assigned to the CH waste stream have been applied to any container determined to be RH. Waste was generated directly from these processes and from associated activities such as maintenance and decontamination.

Hazardous Waste Determinations

Ignitability, Corrosivity, Reactivity

The waste material in this waste stream does not meet the definition of ignitable, corrosive, and reactive as defined in 40 Code of Federal Regulations (CFR) 261, *Identification and Listing of Hazardous Waste*. Ignitable and reactive materials are not present in HBL TRU waste. Corrosive liquids also are not anticipated due to liquid waste absorption procedures that go back to the early 1970s; however, any containerized liquids found in TRU drums will be removed prior to certification of waste for disposal at WIPP. Operating procedures required all acids to be neutralized and all pyrophorics to be reacted before being packaged in TRU waste (References C067, P018, P094, P113). It is important to note that SRS treated absorbed acids and bases as non-hazardous based on the results of tests on absorbed nitrates (neutralized nitric acid), the largest potential corrosive material in job control waste, which indicated such waste to be non-hazardous (References C067, P073). Rinsing and neutralization of acid-soaked sponges and rags was required (References P026, P108). No free liquids were packaged for disposal (References P014, P094). This prohibition remained in place throughout the time period of waste generation, as evidenced by the prohibition against free liquids in the SRS Waste Acceptance Criteria Manual (Reference P050). Free liquids were instead required to be absorbed since at least 1977 with Celite (diatomaceous earth), soda ash, polyester cloths, and Oil-Dri (fullers earth and quartz)(References D005, D018, P015, P056, P063, P083, P094). Oily rags were also required to be packaged with Oil-Dri absorbent to absorb any oily liquid (References D005, P014, P015, P018, P026, P073, P094, P113).

Ignitability

This waste does not exhibit the characteristic of ignitability as defined in 40 CFR 261.21. Ignitable liquids and oxidizers were used in H-Canyon and FB-Line operations. However, the waste is not a liquid, an ignitable compressed gas, or an oxidizer and is not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change. In addition, prohibited items (e.g., prohibited amounts of liquids) identified during radiography will be remediated or removed from waste containers prior to shipment to WIPP. Therefore, this waste does not exhibit the characteristic of ignitability (EPA HWN D001) (Reference M169).

Although historically assigned HWNs (References D018, P052), sodium, phosphorus, and magnesium were not used as pure metal in the HBL process or associated activities (References C098, C116, C136, C152, D059). The facility did use non-reactive magnesium oxide (Reference C098). Calcium also was not used in HBL (References C098, C116).

Oxidizers are known to have been used throughout the time period of waste generation in operating areas where TRU waste has been generated or handled. Nitric acid in particular was used extensively as a process chemical (References C001, D007), as were hydrogen peroxide, iron nitrate, permanganates, and aluminum nitrate (References C098, C116, D058, D060, M058, M062, M063, P001). Hydrogen peroxide was used for Pu-239 processing probably in Scrap Recovery (References C098, C116). Hydrogen peroxide was removed from the HBL Basis for Interim Operations (BIO) (Reference D058) in a July 2001 revision. Permanganate used in the Lab Line was reduced with nitrite and excess sodium permanganate solution that was infrequently used was solidified or absorbed (Reference C136). Old HB-Line personnel recalled having a procedure that required neutralization of acids and possibly of such oxidizers (Reference C098). A 1974 procedure (Reference P063) for handling radioactive waste gave special instructions for "wet solid waste," which consisted of acid-soaked sponges, rags, wipes, or polypropylene cloths. Such waste was to be rinsed with water to remove any product and acid and then packaged with diatomaceous earth absorbent to absorb moisture (Reference P063). SRS also used a polypropylene felt, tested in 1965, for cleaning to minimize fire hazards due to oxidation of cellulosics (Reference C099). SARs and other documents from the 1990s maintained that free liquids were not packaged for disposal (Reference D088), but were instead absorbed with Celite (diatomaceous earth), soda ash, and Oil-Dri (fullers earth and quartz) (Reference D005).

Corrosivity

The waste in this waste stream is not liquid and does not contain unreacted corrosive chemicals; therefore, it does not meet the definition of corrosivity (D002) found in 40 CFR 261.22. The materials are not liquid; and prohibited items (e.g., prohibited amounts of liquids) identified during radiography will be remediated or removed from waste containers prior to shipment to WIPP. Therefore, this waste does not exhibit the characteristic of corrosivity (EPA HWN D002) (Reference M169).

The following corrosive chemicals were shown on a 2000 BIO report: nitric acid, sodium hydroxide, sodium hypochlorite, and sulfuric acid, as well as oxalic and ascorbic acids (Reference D058). Nitric acid was also used in New HB-Line for sump flushing (Reference C105). Caustics were used during D&D activities in the Old HB-Line (Reference M021). Neutralization kits were primarily used in HBL Special Recovery (References C105, C136, P027, P072, P082, P083, P108) and appear very often in generator waste descriptions (References M014, M015).

Beginning in the early 1970s, residual chemicals disposed in TRU waste were required to be absorbed and/or neutralized (References C032, C067, C098, P063). By 1989, SRS had tested absorbed/neutralized nitric acid and determined that it was non-hazardous for corrosivity (References C032, C067). Also, as previously stated, TRU waste containers were not to contain free non-residual liquids (References C098, D005). As early as 1974 and up to the present day, operating procedures and Solid Waste requirements (Reference D088) have required all acids to be neutralized (References C067, P093). If acids had been present on waste materials (such as rags), the materials were rinsed with water and then neutralized before being packaged with absorbent and sealed separately (References C078, P056, P070).

Reactivity

The waste material in the waste stream does not meet the definition of reactivity in 40 CFR 261.23. The materials are stable and will not undergo violent chemical change without detonating. The materials will not react violently with water, form potentially explosive mixtures with water, nor generate toxic gases, vapors, or fumes when mixed with water. The materials are not a cyanide or sulfide bearing waste. The materials are not capable of detonation or explosive reaction. Therefore, this waste stream does not exhibit the characteristic of reactivity (EPA HWN D003) (Reference M169).

As previously stated, there were no reactive metals such as sodium, phosphorus, magnesium, or calcium used as pure metal, although HBL did use magnesium oxide (Reference C098), a non-reactive oxide. Also, as of 1988 and by procedure even earlier, there were no routine TRU waste streams at SRS that contained pyrophoric materials or explosives (Reference D088).

During an interview, HBL generators stated that explosives are not expected in HBL waste, as HBL did not dispose of plutonium metal in drums. In addition, although changed out every five years (Reference C140), small explosive charge squibs in the fire system were replaceable from outside of the gloveboxes and therefore, if they were disposed as waste, would not have been sufficiently contaminated to be transuranic (References C098, C140, C152). Hydrazine mononitrate was identified as an HBL process chemical through the mid 1980s, having been used as a dissolution process catalyst (References D007, D055). However, because it was a liquid, it would not have been placed in TRU waste containers without being absorbed, so it would not be considered to be explosive or reactive (Reference C152).

Non-radionuclide pyrophorics were not present in HBL operating area (Reference C001), although the radioactive pyrophoric plutonium was present. Under the certification program instituted in 1986, any pyrophorics were required to be treated to be non-pyrophoric (References C032, C067, P050) prior to packaging as TRU waste. Zirconium metal was included with the inputs to the HBL dissolution and recovery operations. For this reason, the zirconium would have been oxidized during these operations and not present in this waste stream, (References D006, D116, D124). Potentially air-reactive resins used in HBL processes are not packaged as TRU waste, but sent to the H-Canyon for disposal (References D005, D050). Under the TRU waste certification program in place during the period of waste generation, any potentially pyrophoric materials were identified in operating procedures and were required to be segregated and labeled non-certifiable (Reference P050).

Toxicity Characteristic

Based on review of AK relative to chemicals used or present in the HBL and supporting operations, waste stream SR-RH-221H.01 is contaminated with toxicity characteristic compounds as defined in 40 CFR 261.24. Where a constituent has been identified and there is insufficient quantitative data available to demonstrate that the concentration of a constituent is below regulatory threshold levels, the applicable EPA HWN is applied to the waste stream. Based on a review of AK documentation and specific assignment of EPA HWNs by SRS to HBL waste inventories following waste generation; the following toxicity characteristic EPA HWNs are assigned to waste stream SR-RH-221H.01; D006 (cadmium), D008 (lead), D009 (mercury), D019 (carbon tetrachloride), D022 (chloroform), D029 (1,1-dichlorethylene), D039 (tetrachloroethylene), D040 (trichloroethylene), and D043 (vinyl chloride).

A 1999 document listed the only hazardous constituents used in the HBL process as cadmium, lead, and chromium (Reference D067). One possible source for these metals was the plutonium oxide product itself, which production specifications allowed the products to contain impurities up to the following concentrations: cadmium (25 parts per million [ppm]), chromium (175 ppm), , and lead (100 ppm)(Reference C110). However, typical concentrations of these metal contaminants were estimated to be 10 ppm (cadmium), 100 ppm (chromium), and 10 ppm (lead) (Reference C139). Even at the maximum concentrations allowed by production specifications, the metal contaminants in the limited amount of these products that contaminate the waste stream could not cause the waste to exceed the regulatory threshold solely from the contribution of these metals contained in the product (References C010, D005, and D006).

Cadmium was listed as a possible contaminant in HBL TRU waste (Reference C002), although other sources suggest that it was not used (Reference C032, C116). Cadmium was used in plates around the New HB-Line in the vessel vent system (Reference C098), although it was not used in the Old HB-Line (Reference C152). HBL also did not use cadmium-coated HEPA filters (References C110, D005). Several source documents have been reviewed that indicate that prevalence of cadmium (References C139, D067, P015, P034, P073) in HBL TRU waste procedures and documents from the time period of waste generation. Based on its possible presence, the HWN D006 will be assigned for cadmium.

Lead is expected in HBL TRU waste (References C002, M014) primarily from lead-lined gloves (References C014, C027, C032, C080, C090, C098, C116, M014) and in glovebox panels that were of a sandwiched stainless-steel-lead-water-stainless construction with acrylic/lead glass windows (Reference D056). Although job control waste raw materials including yellow plastics do not contain enough lead to exceed the regulatory threshold (Reference D041), lead-lined gloves are frequently generated and managed as TRU waste due to their 56.1-73.7 percent lead per pair; generators conservatively estimate 74 percent lead when completing OSR 29-90 forms (Reference D005). No shielding or bricks are expected in HBL waste except possibly in

D&R waste (Reference C098), although HBL did use lead shielding (Reference C116). The New HB-Line was constructed with lead in gloveboxes, acrylic and leaded glass on the windows at the entry station, charge preparation gloveboxes, and wing cabinets (Reference D003). The dissolver and product transfer glovebox in new Special Recovery had only lead shielding with leaded glass on the windows. Generators indicated on TWPDs completed during the 1986-1990 time period (References C010, M014) the HWN D008 for lead. According to a 1996 procedure, the only HBL mixed waste generated regularly was, "lead lined gloves that have been used in process cabinets," (Reference P026). Drums containing mixed waste such as leaded gloves were to be stored in the Mixed Waste Staging Area (Reference P014). Although an aggressive segregation procedure was in place (References C105, C136, C152, D067, P026, P073) and generators did not indicate D008 for the segregated containers, some of the segregated containers in waste stream CH SR-W027-221H-HET were found to contain lead during characterization activities (References C163, DR013, M014, M015, M115). Considering all of the potential sources, the HWN D008 will be assigned for this waste stream.

Mercury was not thought by Waste Management or the Old HB-Line personnel to be commonly used in the facility (References C067, C098, C116) in order to avoid contamination of product material, although it was occasionally included on Waste Management lists because of potential uses of mercury thermometers in non-routine operations such as tank calibration (Reference C067). The Old HB-Line personnel did not believe that they used such mercury measurement equipment due to the need for greater sensitivity (Reference C098), but they did recall removing mercury manometers that may have been part of a vacuum system in room 454, circa 1984 (Reference C156). Also, job control waste raw materials including yellow plastics do not contain enough mercury to exceed the regulatory threshold (Reference D041).

There should be few or no fluorescent bulbs in the waste, as there were no lights inside of the cabinets where such bulbs could become TRU-contaminated (References C098, C116, C152). While small quantities of fluorescent bulbs may be present in waste from use in huts outside of gloveboxes (Reference C152), such material is not expected to contain sufficient mercury to cause TRU waste drums to be hazardous. Sample data from analysis of randomly-selected drums of crushed fluorescent tubes indicated that the Toxicity Characteristic Leaching Procedure (TCLP) concentrations of metals in these drums either were not above regulatory limits in any of the samples or were not present in sufficiently high concentrations to render a TRU waste drum with only one or two fluorescent bulbs hazardous (References C148, M048). Also, mixed waste receipts indicate that two drums filled with fluorescent bulbs have been disposed as low-level mixed waste, which supports the idea that fluorescent bulbs from outside the glovebox are not sufficiently contaminated to be TRU (Reference M098). Mercury vapor bulbs were actually identified as fluorescent bulbs that were disposed as low-level mixed waste (Reference M098).

The 1970s-era Technical Standards for enriched uranium and plutonium recovery (References D007, D055) identified mercury as being used in recovery ion exchange (at 0.01M concentration) and in the dissolution of plutonium-aluminum alloys or scrap containing metallic aluminum. However, HBL technical support personnel stated that, although the technical standards allowed these activities, the ion exchange operation never ran in Special Recovery, nor were targets or aluminum scrap ever dissolved, in part because Scrap Recovery never received material directly from SRS reactors, as they shut down in the mid 1980s (Reference C156). Mercury catalysis was performed in the Canyon as noted by Old HB-Line personnel (Reference C098), but mercury-catalyzed dissolution was also tested and performed in HBL Scrap Recovery (Reference D055). Mercuric nitrate was also listed in a 1978 SAR as a "principle toxic...material present in the HBL" (Reference D052). Alkaline batteries that may be in TRU waste because HBL personnel did use flashlights (Reference C098) may contribute very small amounts of mercury, although alkaline batteries would not be present in sufficient quantities to exceed the regulatory threshold (References C150, C152). Finally, Old HB-Line personnel recalled that some mercury may have been found during D&R activities or in gloveboxes, associated with pumps and other equipment (Reference C156). Mercury was to be recovered by a vacuum flask aspirator and water, otherwise a spill kit was used. Mercury clean up materials were considered EPA Hazardous waste (Reference D001). Because there is a potential for thermometers, manometers, fluorescent bulbs, and other mercury-containing equipment in TRU waste, EPA HWN D009 will be assigned for this waste stream.

With the exception of carbon tetrachloride and trichloroethylene, the specific uses of organic chemicals were not identified in the AK record for toxicity characteristic EPA HWNs historically assigned in the SRS AK documents associated with HBL waste management and characterization. However, the assignment these HWNs is being maintained on this waste stream for carbon tetrachloride (HWN D019), chloroform (HWN D022), 1,1-dichlorethylene (HWN D029), tetrachloroethylene (HWN D039), trichloroethylene (HWN D040), and vinyl chloride (HWN D043) to be consistent with the assignment of HWNs to the corresponding CH waste stream SR-W027-221H-HET based on a SRS directive declaring the waste stream as toxicity characteristic waste for these compounds (References C098, C105, C155, D003, D005, D006, D048, D061).

Listed Waste

F-Listed Waste

Based on review of AK relative to chemicals historically used or present in the HBL, waste stream SR-RH-221H.01 contains or is mixed with F-listed hazardous wastes from non-specific sources listed in 40 CFR, Part 261.31. HWNs F001, F002, F003, and F005 were historically applied to SRS HBL TRU waste generated before 1990. However, carbon tetrachloride (HWN F001) used in the 1950s was the only F-listed chemical HBL personnel could remember using as a solvent (References C098, C104, C105, C152, D059). After January 25, 1990, generators did not indicate HWNs for any F-listed solvents on their TWPD or Transuranic Waste Container Characterization (TWCC) forms (References M014, M015, M115) for any drums, nor did the procedures for completion of these forms mention any solvents during much of the time period of waste generation (Reference P073). A 1996 TRU waste packaging procedure explicitly provided for the assignment of HWNs F002 and F003, if applicable (Reference P014). Based on a review of AK documentation and specific assignment of EPA HWNs by SRS to HBL waste inventories following waste generation; the following F-listed EPA HWNs are assigned to waste stream SR-RH-221H.01; F001 (carbon tetrachloride, tetrachloroethylene, 1,1,1-trichloroethane, and trichloroethylene), F002 (tetrachloroethylene, 1,1,2-trichloro-1,2,2-trifluororethane, 1,1,1-trichloroethane, and trichloroethylene), and F005 (methyl ethyl ketone).

The use of several F003-listed constituents and commercial products containing these compounds were document in the AK reviewed for HBL operations, including acetone, ethyl acetate, cyclohexanone, and methanol (References C002, C006, C083, C098, C105, C156, C157, C158, D018, D058, D059, D075, M051, M099, P052, P061). EPA HWN F003 was assigned to the corresponding CH waste stream SR-W027-221H-HET; however, when used as a solvent, these chemicals are listed solely because they are ignitable in the liquid form. The waste stream does not exhibit the characteristic of ignitability because it is not liquid; therefore, HWN F003 is not assigned to SR-RH-221H.01.

1,1,1-trichloroethane was not used as a pure commercial chemical (References C098, C105, C152), but it was present as the primary solvent in Magnaflux SKC-NF/ZC-7B Cleaner/Remover (Reference M051), which was used in the HBL (References C017, C105). As a result, the HWN F002 will be assigned for 1,1,1-trichloroethane.

Trichloroethylene was used as a solvent in Raycohesive B-32, a glue used to seal drum liner lids (References C057, P048). An HWN would not be assigned solely on the basis of this packaging-related use. One other source document also suggested that trichloroethylene was not used in HBL (Reference C032). However, trichloroethylene was the primary solvent in a trade-named chemical called Triclene that was used in the Old HB-Line (References C098, M051). Because of its solvent usage, the HWN F002 will be assigned for trichloroethylene.

EPA has provided regulatory clarification that the assignment of HWN F001 is only appropriate when the listed solvents are used in a large-scale degreasing operation such as cold cleaning or vapor degreasing on an industrial scale. However, the assignment HWN F001 is being maintained on this waste stream for carbon tetrachloride, 1,1,1-trichloroethane, trichloroethylene, and tetrachloroethylene to be consistent with the assignment of HWNs to the corresponding CH waste stream SR-W027-221H-HET based on a SRS directive declaring these compounds as F001-listed solvents (References C098, C105, C155, D003, D005, D006, D048, D061).

In addition to information about chemicals included on lists of historically applied HWNs, evidence of the use of other solvents was found. Freon was used as a coolant in the New HB-Line vessel vent system (Reference D003) and in the Old HB-Line process refrigeration units (References C032, C116). Some Freon from the vessel vent system was disposed due to a leak; this leak cleanup would have generated contaminated TRU waste (Reference C098), although Freon from this source would not be considered hazardous waste because it was not being used as a solvent. However, other sources suggest that Freon was used in HBL (References C002, C017) for decontamination (Reference C032) and/or as a cleaning agent throughout the facility (Reference C067), even though New HB-Line personnel stated that Freon was not used for decontamination (Reference C105). Based on this solvent/cleaning agent usage, the HWN F002 will be assigned for Freon (1,1,2-trichloro-1,2,2-trifluoroethane).

Source documents discussing methyl ethyl ketone differ on whether it was (Reference C002) or was not used (Reference C032). It was definitely a solvent in polyvinyl chloride (PVC) cement used in the facility (Reference C017). Because spent PVC cement may have been included in TRU waste containers, the HWN F005 will be conservatively assigned for this chemical.

Methylene chloride is expected only associated with use in the adhesive MOR-AD B 32 (and in its predecessor Raycohesive B-32), which were used to bond together Type II 90-mil drum liner lids and bodies used in conjunction with the 55-gallon U.S. Department of Transportation (DOT)-17C drums to package and transport TRU waste (References C057, P048, P059). Because its use is only associated with packaging, HWN F002 is not assigned for this contaminant.

K-Listed Waste

The materials in waste stream SR-RH-221H.01 are not hazardous waste from any of the sources specified in 40 CFR 261.32. Therefore, waste stream SR-RH-221H.01 is not assigned a K-listed HWN.

P- and U-Listed Wastes

With the exception of hydrazine (HWN U133), this waste stream was not mixed with a discarded commercial chemical product, an off-specification commercial chemical product, or a container residue or spill residue thereof as defined in 40 CFR 261.33. No other P- or U-listed wastes were identified on the container paperwork (e.g., 29-90 forms). Also, other chemicals are present only as contamination on waste materials, rather than as pure commercial chemical product. Other process chemicals were used for their intended purposes and were not capable of contaminating the waste stream as pure or unused chemical product (Reference M169).

The SRS Solid Waste Division determined that the EPA HWN U134 for hydrofluoric acid did not apply to HBL/H-Canyon waste generated prior to 1986, the basis for this determination was the belief that hydrofluoric acid had not been used in the facility (Reference D059). Old HB-Line personnel recalled that hydrofluoric acid ceased to be used after 1973 (Reference C098), and was used only before 1970 in the Pu-239 oxide process (Reference C152), and/or was never used in Special Recovery (References C104, C116, C152). References to ubiquitous use of fluoride ion in Scrap Recovery (Reference D055) are consistent with information from Old HB-Line personnel that they used potassium fluoride, rather than hydrofluoric acid (Reference C152). On the other hand, technical standards state that hydrofluoric acid was brought into the New-HBL as a liquid during the Cassini mission (10/90-6/95 in Scrap Recovery, 1/93-8/95 in plutonium oxide) to adjust fluoride concentrations (References D005, D050). However, HBL managers and technical support personnel stated unambiguously that hydrofluoric acid was never brought into HBL as pure chemical (Reference C156) or used as a pure chemical in any process, consistent with scrap dissolution procedures (Reference P105). Hydrofluoric acid was also used in the lab line during the Cassini Impurity Analysis Program from about 1994-95 for determination of solids in liquids, for solid sample dissolution, and in standards used for trace metals analyses (although it would not have been the sole active ingredient in the latter formulation) (Reference C136). However, all lab chemicals were prepared in Building F/H Area Laboratory (Reference C136) and bagged into the HBL after dilution; hydrofluoric acid was diluted with nitric acid before entry into HBL for solids dissolution (Reference P104), so that pure chemical hydrofluoric acid could not have contaminated HBL TRU lab waste. Because hydrofluoric acid was not brought into HBL as a pure commercial chemical and was used for its intended purpose, the HWN U134 will not be assigned for this waste stream.

Hydrazine (rather than hydrazine mononitrate) was used during anion exchange in Scrap Recovery and during neptunium oxalate precipitation; the maximum allowable concentration was 0.15M (References D007, D055). Some Old HB-Line Facility personnel did not believe that pure liquid hydrazine was disposed as TRU waste (Reference C152), or only recalled using hydrazine mononitrate (References C098, C104, C105, M058, M062, M063), while other personnel discussed use of hydrazine (References C116, C152). However, it is possible that pure liquid hydrazine may have contaminated spill cleanup residues following significant spill and contamination events in Scrap Recovery, as previously described. On this basis, the HWN U133 will be assigned for hydrazine.

Beryllium is expected to be present in TRU waste as a contaminant in plutonium oxide product (Reference C110) and because of the dissolution of plutonium-beryllium neutron sources and plutonium oxide/beryllium mixtures in Scrap Recovery (References D005, D006, D067, D115). Any beryllium that was dissolved, however, was sent to the H-Canyon as solution where the plutonium was recovered and the remaining solution (including beryllium) was discarded to waste tanks. Beryllium was never known to have been brought into the facility as a pure commercial chemical in powder form (References C151, D059). Therefore, waste stream SR-RH-221H.01 is not a P015-listed waste for beryllium powder.

Polychlorinated Biphenyls

Polychorinated biphenyls (PCBs) are not expected to be present in this waste. Potential sources of PCBs include oil-filled electrical equipment, fluorescent light ballasts, and hydraulic oils. There were no large electrical units (capacitors) identified for this building (Reference C084) and no such electrical equipment identified in this waste (Reference C116). There were no fluorescent light fixtures located inside gloveboxes (Reference C105). Hydraulic oils (References C116, C152) used in the HBL were evaluated and found not to contain PCBs (Reference C161). Contaminated oil in neptunium-Line hydraulic system sumps was absorbed in liter bottles (Reference C105) but would not contain PCBs because it would have been manufactured long after the date on which PCB manufacture was banned in the U.S. Therefore, waste stream SR-RH-221H.01 is not regulated as a Toxic Substance Control Act waste under 40 CFR 761 (Reference M169).

Prohibited Items

As discussed above, pyrophorics and explosives are not expected in this TRU waste stream. No compressed gas cylinders or explosives are expected (Reference C105). Any prohibited items identified during radiography will be processed (e.g., absorbing residual liquids, opening sealed containers greater than four liters, venting pressurized containers) to correct the deficiency (References P109, P110, P111, P112).

Method for Determining Waste Material Parameters Weights per Unit of Waste

The waste material parameters (WMPs) for the waste stream were estimated by using the characterization data from CH waste stream SR-W027-221H-HET and contained in the WIPP Waste Data System (WDS) for 7,014 drums from radiography lots 1 through 143 which give data available up through February 3, 2006. The waste in this RH waste stream is physically identical to the CH portion (the only difference being the surface dose rate on the drums). The CH data is therefore representative of the RH containers. Waste items were categorized into one of the following WMPs: iron-based metals/alloys, aluminum-based metals/alloys, other metals, other inorganic materials, cellulosics, rubber, plastics (waste materials), inorganic matrix, organic matrix, and soils/gravel. The WMP weights were assessed and an average was determined that was applied to the RH waste stream. The results of the assessment are presented in table, Waste Stream SR-RH-221H.01 Waste Material Parameters.

Waste Stream SR-RH-221H.01 Waste Material Parameters

Waste Material Parameter	***Estimated Weight Percent***	***Weight Percent Range***
Iron-based Metals/Alloys	25.80%	0.0 – 97.27%
Aluminum-based Metals/Alloys	1.06%	0.0 – 64.63%
Other Metals	0.28%	0.0 – 70.87%
Other Inorganic Materials	9.29%	0.0 – 93.69%
Cellulosics	5.70%	0.0 – 95.41%
Rubber	16.69%	0.0 – 97.56%
Plastics (waste materials)	40.43%	0.0 – 98.36%
Inorganic Matrix	0.70%	0.0 – 92.50%
Organic Matrix	0.04%	0.0 – 73.68%
Soils/Gravel	0.0%	0.0 – 0.0%
Total Inorganic Waste Avg.	**37.13%**	
Total Organic Waste Avg.	**62.86%**	

List of AK Sufficiency Determinations Requested for the Waste Stream

There are no AK sufficiency determination requests for this waste stream.

Transportation

This waste stream and its chemical constituents have been reviewed for consistency with listed RH Transuranic Waste Content (TRUCON) codes and they are consistent.

Beryllium

Any beryllium remaining in the Scrap Recovery Facility TRU waste would be present only in trace quantities (References C178). Waste packages that contain beryllium are therefore expected only in particulate form as an impurity or in residual trace amounts less than 1 percent by weight of the waste in each drum (References M122, M133).

Radionuclide Information

RH waste stream SR-RH-221H.01 consists of drums originally included in the corresponding CH waste stream SR-W027-221H-HET. Radiological characterization for waste stream SR-W027-221H-HET has identified the radionuclides suspected to be in HB-Line and H-Canyon TRU waste. The certified NDA results from the WDS for 2,890 CH drums were averaged and are presented in table, Reported Radionuclides in HB-Line TRU Waste.

Reported Radionuclides in HB-Line TRU Waste

Radionuclide	Total Radionuclide wt%	Suspected Present?
	WIPP Required Radionuclides	
Pu-238	8.12	Y
Pu-239	5.41	Y
Pu-240	0.41	Y
Pu-242	0.02	Y
Am-241	0.05	Y
U-233	0.04	Y
U-234	3.94	Y
U-238	18.53	Y
Cs-137	Trace	Y
Sr-90	Trace	Y
	Additional Radionuclides	
H-3	Trace	Y
C-14	Trace	Y
Na-22	Trace	Y
Ni-59	Trace	Y
Co-60	Trace	Y
Se-79	Trace	Y
Tc-99	Trace	Y
Ru-106	Trace	Y
Sb-125	Trace	Y
Sn-126	Trace	Y
I-129	Trace	Y
Ba-133	Trace	Y
Pb-214	Trace	Y
Ba-137m	Trace	Y
Cs-134	Trace	Y
Ce-144	Trace	Y
Pm-147	Trace	Y
Eu-152	Trace	Y
Eu-154	Trace	Y
Tl-208	0.14	Y
Bi-214	Trace	Y
Ac-227	Trace	Y
Th-232	57.17	Y
U-232	Trace	Y
U-235	2.88	Y
U-236	Trace	Y
Pu-241	0.15	Y
Am-243	Trace	Y
Cm-243	Trace	Y
Cm-244	Trace	Y
Cm-245	Trace	Y
Np-237	3.16	Y
Cf-249	Trace	Y

Note: "Trace" indicates <0.01 weight percent (wt%) for that radionuclide.

Payload management will not be utilized for this waste stream.

Source Documents

Tracking Number	Title
C001	Memo to TRU Waste Coordinators, J.A. Schlesser: WIPP Certification Plan
C002	Memo: Information on TRU Waste Characterization in Support of the WIPP No-Migration Variance Petition
C006	Memo: Suspect Hazardous Waste Handling Requirements
C008	Memo to V.G. Dickert, et. al.: Guidance for Continual Surveillance for Hazardous Waste
C010	Memo: Disposal of TRU Boxed Waste
C011	Memo: Disposal of Spray Cans with Material
C012	Memos: Characteristics of SRS TRU Boxed Waste
C014	Memo to C.R. Goetzman: Annual Surveillance of HB-Line TRU Waste Certification Program
C017	Memo to R.F. LeBert: Hazardous Products in Our MSDS Books (U)
C018	Memo: ALARA 1146 Clarification (U)
C020	Memo: BH-38 Decontamination Material Mix-up
C024	Memo to G.W. Earle: Neptunium Shielding Calculations
C027	Memo to M.A. Ebra: Annual Surveillance of HB-Line TRU Waste Certification Program August 28, 1989
C029	Memo to R.L. McQuinn, et. al.: Program for the Handling of Hazardous Waste Rags and Wipes (U)
C031	Meeting-HB Line Decommissioning - Disposal of Neptunium Sweeping
C032	Memo to M. O'Rear re: SR Information on TRU Waste Characterization in Support of the WIPP No-Migration Variance Petition
C038	Memo to J.P. Duane re: 221-H B-Line History
C039	Memo to R. Anderson re: Neptunium Sweepings, 221-H B-Line
C040	Memo to F. Lustig Re: Project S-2991 Transuranic (TRU) Waste Facility Waste Characterization and Burial Container Criticality Limits
C044	Memo to HB-Line Distribution re: Validation of the HB-Line Plutonium Oxide Facility Glovebox Cabinet Cleanout
C045	Nuclear Safety Limits for Various Isotopes in the Burial Ground
C046	Nuclear Criticality Safety in Storing WIPP Certified TRU Waste
C047	Nuclear Safety Limits for Various Nuclides in Burial Ground Concrete Culverts
C048	TRU Mixed Waste Generation and Characterization
C050	Requested Information Regarding TRU Variance Letter
C054	Requirements for Packaging Transuranic Waste
C055	Instructions for Using Revised Burial Forms
C057	A Comparative Evaluation of Raycohesive® B-32 and MOR-AD® B-32 Adhesives
C058	Information Concerning the Retrieval of Low Activity Transuranic (TRU) Waste Drums from TRU Pads 2-6 (U)
C063	Operational Practices During Emplacement of Transuranic Waste on TRU Pads 1-6 in the SRS Burial Grounds
C066	Interview of C. McClard Regarding the HB-Line Process Timeline
C067	SR Information on TRU Waste Characterization in Support of the WIPP No-Migration Variance Petition
C069	Description of Transuranic Solid Waste at Savannah River
C071	WIPP-Waste Acceptance Criteria
C075	Memo: Identification of TRU Waste
C077	Memo: Program for Identification and Segregation of Transuranic Waste with Contamination Levels Between 10 and 100 nCi/g
C078	Letter to J.P. Duane: HB-Line Waste Packaging Requirements
C079	Memo to T.H. Gould: Systems Analysis Applied to TRU Waste Management (U)
C080	Memo: Pb-Lined Gloves Telephone Calll to O. Fordham, Letter to O. Fordham: Pb-Lined Gloves and Request for Concurrence to use the Exemption from Particle Size Reduction in the TCLP Method 11311 for Lead Lined Gloves (U)
C083	Miscellaneous Correspondence on Solvent Contaminated Waste (a-f)

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C084	Memo to M.J. Sires: Polychlorinated Biphenyl's (PCBs) Used in Electrical Equipment
C086	Letter to O.M. Morris: Segregation of Combustible TRU Waste
C088	Record of Communication – Interview of Mr. Odum and Mr. Maloney
C090	Telephone Conversation with Carol Allgood, NMMD: Blue Dot Program at FB-Line and HB-Line
C091	Record of Communication – Atomic Energy Defense Activities
C093	Letter re: TRU Waste Packaging Requirements Polyethylene Boxes for HEPA Filters
C094	Record of Communication — Interview with Mr. Sogge RE: TRU Waste Generation in Old HB-Line
C098	Record of Communication for Interview of K. Menger, T. Reilly, S. Bowers, and E. Dillon
C099	Memo to W. Doe re: Tests on Polypropylene Felt
C100	Memo to T. Reilly re: Problem No. ST-SS-G-039 Sources of Contaminants in $238PuO_2$
C104	Notes from Interview of J. "Chip" McClard
C105	Record of Communication for Interview of G. Roberts, B. Bush, and M. Minor
C110	Letter to R.D. Leedle: Savannah River Plant Project S-2256 — Replace Obsolete Processing Facilities 221-HB-Line DA-221-H Plutonium-238 Oxide Product Quality
C114	Separations Incident SI-80-11-140
C116	Record of Communication with Mike Mobley
C117	Letter to R.C. Anderson: Neptunium Sweepings Packaging, 221-HB-Line
C129	Radioactivity and Dose Rates from Aging Plutonium in Future Waste Management Operations (U)
C131	Email: Job Hazard Analysis of Scrap Recovery Clean Out Work (U)
C132	Letter to R.E. Meadors, R.C. Anderson: Handling TRU Waste From H-Canyon Frames
C134	Memo to D.H. Thomas: Burial of Old Frames and Sample Aisle Equipment
C135	Memo to D.H. Thomas: Disposal Methods For Pu-238 Frame I
C136	Record of Communication for Interview of C. Ryberg and R. Mahannah
C139	RCRA Characterization of SRS-Produced Plutonium Oxide
C140	E-Mail to P. Fulghum: Squib Igniters Used In "Halex" Fire Suppression
C146	Record of Communication for Interview of D. Gartland by J. Whitworth
C148	Summary of SRS Correspondence and Data on Fluorescent Light Bulbs
C150	Record of Communication for Interview of M. Boolish by T. Burns and W. Estill: Mercury Content in Batteries
C151	Letter to M.A. Kokovich: Removal of P015 Waste Code from TRU Waste Containers
C152	Record of Communication for Interview with G. Blackburn, B. Smith, C. McClard, C. Byrd, and F. Loudermilk
C155	Applicability of RCRA Waste Codes to TRU Waste Generated in HB-Line Interoffice Memo, From: C.B. Stevens, To: M.A. Kokovich
C156	Record of Communication: Interview of Bob Smith, Rick Burns, and Jim Barber, Subject: TRU Waste and Hazardous Chemical Usage in the New HB-Line
C157	Record of Communication: Interview of Ray Smith and Betty Bush, Subject: Use of Chemicals (Acetone) by HBL Maintenance
C158	Record of Communication — Interview with J.W. Barber Re: Use of Acetone in the New HB-Line Facility
C161	Fyrquel Hydraulic Oil
C162	Pu-238 Spectrum
C163	Re-evaluation of Savannah River Site HB-Line waste streams
C164	Interview with Ann Gibbs concerning Thorium-232 in the HB-Line Waste
C165	Record of Communication: Discussion of Greater Confinement Disposal (GCD) at SRS.
C178	Email correspondence with Jeff Lunsford regarding beryllium
C197	Memo to CCP Record re: Addition of Containers to Waste Stream SR-RH-221H.01
C217	Interoffice Memorandum from Marcia Birk to M. G. Looper and Cary Stevens. RE: Path Forward for Silver Berl Saddle Management
C219	Waste Stream Container Evaluation Memorandum for Waste Stream SR-RH-221H.02
C1001	Waste Stream Container Evaluation Memorandum for Waste Stream SR-CH-221H.02

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D001	Analytical Laboratories Laboratory Technician Program, Proper Handling of Spills
D003	Building 221-H, B-Line Scrap Recovery Facility (SUP 2A) Safety Analysis Report
D004	Dismantlement and Decontamination of a Plutonium-238 Facility at SRS
D005	Characterization of HB-Line Transuranic (TRU) Waste (UCNI)
D005A	Characterization of HB-Line Transuranic (TRU) Waste
D006	Technical Manual — Plutonium-238 Scrap Recovery, Building 221-H
D007	221-H-SP Technical Standards (UCNI)
D009	Revised Pre Title I Design Safety Evaluation for the Retrieval Operations of Transuranic Waste Drums in the Solid Waste Disposal Facility (U)
D010	Radioactive Waste Burial Grounds
D011	Storage of Solid Radioactive Waste
D012	Solid TRU Waste Processing and Retrievable Long-Term Storage –Technical Data Summary
D013	Storing Solid Radioactive Wastes at the Savannah River Plant
D014	Radiogenic Gas Accumulation in TRU Waste Storage Drums
D015	Savannah River TRU Waste Inventory Workoff Plan
D016	Implementation Plan for Buried Transuranic Waste at the Savannah River Plant
D018	Waste Analysis Plan (TRU Waste Storage Pads and ETWAF/WCF)
D019	History of DuPont at the Savannah River Plant
D020	Safety Analysis – 200 Area Savannah River Plant Burial Ground Operations
D021	System Plan for the Solid Waste Division
D024	Statement of Work Chemical Inventory and Characterization of Waste Container Contents by Surface Acoustic Wave Technology
D026	Solid Waste Division 1998 System Plan
D027	Transuranic Waste Projections at SRS for Long Range Planning (U)
D029	Strategic Plan for Savannah River Site (SRS) Transuranic Waste
D030	Savannah River Site Solid Waste Management Facility Safety Analysis Report
D031	Savannah River Site Transuranic Waste Program
D034	Transuranic Waste Baseline Inventory Report
D035	U.S. Atomic Energy Commission AEC Manual: Chapter 0511 Radioactive Waste Management
D037	Management of Transuranic Contaminated Material
D038	Radioactive Waste Management
D041	Response to DOE Request for Status on Procurement and Disposal of Yellow Pigmented Items at SRS (U)
D043	Chapter 20, Savannah River Site at Fifty: Steward Ship and Legacy
D044	Old Radioactive Waste Burial Ground
D046	Researcher Provides a Historical Perspective for Plutonium Heat Sources
D048	Technical Standards For H-Area B-Line Scrap Recovery
D049	Technical Standards for H-Area B-Line, Neptunium Oxide Facility
D050	Characterization of HB-Line Low-Level Waste
D051	Milliwatt Surveillance Program Ensures RTG Safety and Reliability
D052	Systems Analysis — 200 Area Savannah River Plant HB-Line Operations
D053	Physical Behavior of Pu-238 Oxide (U)
D054	Thorium Processing in H-Canyon Technical Standards
D055	Technical Standard Enriched Uranium and Plutonium Scrap Recovery in HB-Line
D056	Safety Analysis — 200 Area; Savannah River Plant, Separations Area Operations, H, B-Line, Plutonium Oxide Facility (Sup 2C)
D058	HB-Line Basis for Interim Operation (U)
D059	Applicability of RCRA Waste Codes to TRU Waste Generated in HB-Line Before 1986
D060	Calc Note — HB-Line Chemical Hazard Analysis (U)
D061	Technical Standards for H Area B-Line Plutonium Oxide Facility
D062	Recovering U-235 and Pu-238-Pu-239 in HBL
D064	Separations Incident, SI-76-24 — Solids in Filtered Enriched Uranium Scrap Solution – 221-HB-Line

Tracking Number	Title
D065	Separations Incident, SI-76-16 — Unexpected Reaction in Scrap Recovery Dissolver – 221-HB-Line
D066	Separations Incident, SI-81-5-52 — Contamination Release, HB-Line Scrap Recovery Facility
D067	Separations HB-Line Facility Transuranic (TRU) Waste Certification Plan
D069	Separations HB-Line Low-Level waste Certification Plan Assessment Report (U)
D075	1992 Renewal application for a RCRA Part B Permit, Savannah River Site Volume XIII – TRU Pads Facility and Waste Certification Facility, Revision B, December 21, 1993
D079	TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant
D080	Los Alamos National Laboratory Transuranic Waste Characterization/Certification Program, Acceptable Knowledge Summary Report for Combustible/Noncombustible, Metallic, and HEPA Filter Waste Resulting from 238Pu Fabrication Activities
D084	Technical Safety Requirements Savannah River Site — Solid Waste Management Facility (U)
D088	Savannah River Certification Plan for Newly Generated, Contact-Handled Transuranic Waste
D090	Test Authorization No. 2-917 for Cleanup of Room 311 Sumps
D092	Low Level Radioactive Waste/Mixed Waste Certification Plan Separations HB-Line Facility
D095	History of DuPont at the Savannah River Plant
D098	SRP Thorium Processing Experience
D099	Sample Schedule for HB-Line and the Compact Billet Line in 235-F
D101	Works Technical Report for July 1977
D107	Active Well Neutron Coincidence Assays for U-235 Content in HB-Line Desicooler Repackage Campaign at the Savannah River Site
D108	Analysis of Events Associated with First Charge of Desicooler Material
D109	Draft Environmental Impact Statement for the Proposed Consolidation of Nuclear Operations Related to Production of Radioisotope Power Systems
D110	Westinghouse Savannah River Company Annual Report 2003
D111	Westinghouse Savannah River Company Annual Report 2004
D112	Annual Report Washington Savannah River Company 2005
D113	Washington Savannah River Company, Setting The Stage For Tomorrow, 2006 Annual Report
D114	Neutralization of Plutonium and Enriched Uranium Solutions Containing Gadolinium as a Neutron Poison
D115	Dissolution of FB-Line Residues Containing Beryllium Metal
D116	HB-Line Safety Analysis Report (U)
D120	Dissolution of Fissile Materials Containing Tantalum Metal
D124	Systems Analysis — 200 Area Savannah River Plant. Chemical Separations Facilities Canyon Operations, Volume 1
D127	Treatability Variance for Silver Coated Packing Material
DR001	Discrepancy Resolution: Physical Form Leaded Gloves
DR013	Consolidation of waste streams
M009	TRU Waste Drum Data Sheet for Five Containers
M012	Operations Pre-Plan Checklists (ADM-HB-4177)
M014	Burial Ground Records and TRU Waste Package Data Forms
M015	TRU Waste Container Characterization Forms (OSR 29-90)
M021	Dismantlement and Decontamination at the Savannah River Site
M022	HB Line's New Facility Finishes First Campaign
M023	Radiological Work Permit for packaging of a high rate HEPA filter from Room 514.
M026	SR-W027 DOE waste stream Questionnaire from DOE National Core Mixed and TRU Waste Data Requirements (from MITI)
M027	Chronological History of the TRU Drum Vent Filter
M028	History of Transuranic Waste Management at the Savannah River Site
M030	Characterization of SRP Retrievably Stored Transuranium Waste
M034	Presentation: Savannah River Site Mixed waste streams Data and Photo Catalog

Tracking Number	Title
M037	Contingency Plan for Transuranic Waste Storage Pads and Experimental TRU Waste Assay Facility/ Waste Certification Facility (ETWAF/WCF)
M040	Presentation: Savannah River Site Transuranic Waste Program
M041	Presentation: Savannah River Site Waste Characterization Plans
M046	Power Point Presentation: Storage and Disposal History
M047	TRU Waste
M048	Fluorescent Tube Disposal Gets OK
M051	MSDSs
M052	COBRA Database Update
M054	Miscellaneous SRS Maps and Location Information
M055	Questions Regarding Drum Retrieval Plans
M056	Old HB-Line Pu-238 Powder Can Inventory
M057	Waste Acceptance Criteria for USF/HB-Line Waste Handling Facility
M058	Notes — HB-Line TRU Waste
M061	Figure 2 — Schematic of New HB-Line Plutonium-238
M062	Old HB-Line Pu-238 Powder Can Inventory
M063	Handwritten table of chemical information
M066	HB-Line AK Tracking Spreadsheet
M069	HB-Line Process History 8/11/70 Through 10/25/74
M073	Accountability Book: Uranium Receipts, Charges, Transfers
M082	Clarification of Scrap Declaration
M094	Accountability Book 4
M095	Accountability Book: SR-IC-50 and MOUND Pu-238 Guide: Receipts and Waste to Burial Ground
M096	Accountability Book: Scrap Book II, Receipts, Dissolver Charges, Waste to Burial Ground
M098	Low Level Mixed Waste Inventory from HB-Line, Post-1990
M099	Chemical Inventory Data
M108	Evaluation of Additional Containers for SRS-4 waste stream SR-W027-221H-HET (HB-Line)
M109	Evaluation of 62 Additional Containers for SRS-4 waste stream SR-W027-221H-HET (HB-Line)
M110	Evaluation of 32 Additional Containers for SRS-4 waste stream SR-W027—221H-HET (HB-Line)
M112	Excel spreadsheet: waste material parameter analysis for SR-W027-221H-HET waste stream
M115	TRU Waste Container Characterization Forms (OSR 29-90) for drum additions
M122	Acceptable Knowledge Beryllium Assessment for CCP-SRS- AK Reports 1 through 7
M125	TRU Waste Container Characterization Forms (OSR 29-90) for drum additions 6/1/05
M126	Evaluation of Additional Containers for SRS-4 waste stream SR-W027-221H-HET (HB-Line). May 19, 2006
M127	29-90 Forms for drums Added May 19, 2006
M131	INL-Built Nuclear Power Systems Crucial to Future Space Missions – A Growing Mission with High Visibility
M133	Support Data for the Addition of Containers for SRS-4 Waste Stream SR-W027-221H-HET (HB-Line)
M134	Material Safety Data Sheets (MSDS) for Decon Products in NOP 221-HB-4989
M169	Waste Stream SR-RH-221H.01 Container Specific Evaluation Information
M183	Waste Stream SR-RH-221H.02 Container Documentation
M1001	Waste Stream SR-CH-221H.02 Container Documentation
P001	Excess Permanganate, Technical Reference, Procedure Manual L3.11
P003	Proper Disposal of Hazardous Waste in RCA
P004	H-Canyon / Of-H / Old B-Line Facility-Specific Waste Minimization Plan
P007	Changing Internal Cabinet HEPA Filters and Cabinet Supply HEPA Filters, Phase I (U)
P007A	Changing Internal Cabinet HEPA Filter and Cabinet Supply HEPA Filter (U)
P014	Packaging and Sealing TRU Waste in 55-Gallon Drums (U)

Tracking Number	Title
P015	Cabinet Bagport Operations (U)
P016	Operations Pre-Plan Checklist/Pre-Job Briefing (U)
P018	TRU Waste Drum Data Sheet
P022	Changing Gloves/Bags/Safety Covers Using Glove Ejection Tool (U)
P023	Cleaning and Removing Plastic Huts (U)
P024	Draining of Process Jacket Piping (U)
P025	Flushing and Transferring Recovery Cabinet Sumps (U)
P026	Handling TRU Waste (U)
P027	Neutralization of Acidic Wipes (U)
P031	Inspecting, Removing, and Installing Scrap Recovery Process Filter Media (U)
P033	HB-Line Facility Flush Program (U)
P034	TRU Waste Drum Data Sheet for Plutonium (Pu) 242 (U)
P037	Changing HEPA Filters in Room 605/610 (U)
P038	Dissolution of Pu-239 Scrap (Cold Runs) (U)
P042	Inspecting and Assembling 55-Gallon Waste Drum Units (U)
P045	Packaging and Disposing of Dry Radioactive Waste
P046	Special Products HB-Line; Chapters I, II, III, V, & VII
P047	Repackaging of TRU Waste Drums Returned from the Solid Waste Disposal Facility
P048	Sealing Fiberglass Boxes which Contain TRU Waste with TRIMCO Gasket
P049	General Decontamination (U)
P050	Savannah River Site Waste Acceptance Criteria Manual, E-Area TRU Pads Transuranic Waste Criteria
P051	Storing TRU Waste in Concrete Containers
P052	Drum Retrieval from TRU Pads 2-6 (U)
P054	Storage of Transuranium (TRU) Waste
P055	Shipping Waste to Burial Ground
P056	Packing TRU Waste and Sealing in 55-Gallon Drums
P057	Savannah River Plant, Management of Solid Radioactive Waste/Radiation and Contamination Control includes DPSOP 40: Burial Container Limits
P058	Repackaging TRU Drummed Waste at 643-G
P059	Handling Transuranium Waste in 221-H Canyon & 211-H Facility
P061	Identifying TRU Drums With Missing Container ID Tags (U)
P062	Burying Classified Waste at Building 643-G
P063	Handling Radioactive Waste
P064	Completing TRU Waste Burial Records
P067	Cabinet Bag Port Operations
P069	Packaging and Sealing Contaminated HEPA Filters in Polyethylene Boxes
P070	Disposal of Non-acidic Contaminated Liquids
P072	Neutralization of Polypropylene Wipes in Scrap Recovery
P073	Completing TRU Waste Burial Records and TRU Waste Data Package
P076	Ordering, Purchasing, and Handling of Blue Dot Chemical Products (U)
P077	Handling Chemicals
P078	Handling HB-Line Samples
P081	Potassium Permanganate ($KMnO_4$) Neutralization and Disposal
P082	Neutralization of Polypropylene Filter Bags in Scrap Recovery (U)
P083	Neutralization of Phase II Non-filter Waste
P084	Filter Change-out and Neutralizing Waste/Filters
P088	Packing TRU Waste and Sealing Drums
P089	Shipping Waste to Burial Ground
P090	Suspect Waste Management Program (U)
P091	Packaging and Sealing TRU Waste in 83-Gallon Drums (U)
P092	Packaging and Sealing the Standard Waste Box
P093	Completing TRU Waste Burial Records and TRU Waste Data Package for Pu-239 (U)

Tracking Number	Title
P094	Packaging Non-Process Cabinet TRU Waste and TRU Decontamination Waste into Drum liners
P096	Operating Gamma Pulse Height Analyzer for Pu-238 Waste
P101	Installing and Removing Polypropylene Filter Bags
P103	Handling of Low-Level Radioactive Solid Waste
P104	Solids Rinsing, HBLine (U)
P105	Dissolution of Fissile Scrap
P106	Absorbing Containerized Liquids
P107	TRU Drum Remediation
P108	Phase I Glovebox Cleanup and Neutralization of Acidic Wipes
P109	Controls for Waste Containers that Require Further Processing
P110	TRU Drum Repackaging
P111	MRS Operations (U)
P112	TVEF Operations (U)
P113	Packaging Phase I (Scrap Recovery) TRU Waste
P119	Procedure 842 from the Phase I Scrap Recovery Manual: Preparing Tantalum (Ta) for Bag Out
P120	Procedure 843 from the Phase I Scrap Recovery Manual: Tantalum (Ta) Bag Out
P121	Procedure 840 from the Phase I Scrap Recovery Manual: Rinsing Tantalum (Ta) After Dissolution
P122	Procedure 841 from the Phase I Scrap Recovery Manual: Weighing Tantalum (Ta)
P125	HB-Line Characterization of Transuranic (TRU) Waste (Supersedes Rev. 10 of NMS-EHB-990045, D005A)